JUN 25 1923
Medical Lib.

SERIES 3—Vol. 6, No. 6 JUNE, 1923

AMERICAN JOURNAL OF OPHTHALMOLOGY

Incorporating — Established by

THE AMERICAN JOURNAL OF OPHTHALMOLOGY.....Adolph Alt 1884
THE OPHTHALMIC RECORD.....Giles C. Savage 1891
ANNALS OF OPHTHALMOLOGY.....James Pleasant Parker 1892
ANALES DE OFTALMOLOGIA.....M. Uribe-Troncoso 1898
OPHTHALMOLOGY.....Harry Vanderbilt Würdemann 1904
OPHTHALMIC YEAR BOOK AND LITERATURE.....Edward Jackson 1904-11

EDITORIAL STAFF

EDWARD JACKSON, Editor
M. URIBE-TRONCOSO
MEYER WIENER

CLARENCE LOEB, Associate Editor
CASEY A. WOOD
HARRY V. WÜRDEMANN

COLLABORATORS

FRANK ALLPORT, *Chicago;* HUGO W. AUFMWASSER, *Denver;* HANS BARKAN, *San Francisco;* ARTHUR J. BEDELL, *Albany;* EDMOND E. BLAAUW, *Buffalo;* MELVILLE BLACK, *Denver;* NELSON M. BLACK, *Milwaukee;* FRANK E. BRAWLEY, *Chicago;* W. E. BRUNER, *Cleveland;* BURTON CHANCE, *Philadelphia;* WM. H. CRISP, *Denver;* W. T. DAVIS, *Washington, D. C.;* GEORGE S. DERBY, *Boston;* ALEXANDER DUANE, *New York;* EDWARD C. ELLETT, *Memphis;* MARCUS FEINGOLD, *New Orleans;* WM. C. FINNOFF, *Denver;* M. W. FREDERICK, *San Francisco;* HAROLD GIFFORD, *Omaha;* SANFORD R. GIFFORD, *Omaha;* HARRY S. GRADLE, *Chicago;* JOHN GREEN, JR., *St. Louis;* D. F. HARRIDGE, *Phoenix, Ariz.;* WM. F. HARDY, *St. Louis;* GUSTAVUS I. HOGUE, *Milwaukee;* THOMAS B. HOLLOWAY, *Philadelphia;* JOHN A. MCCAW, *Denver;* CHARLES H. MAY, *New York;* WM. R. MURRAY, *Minneapolis;* WALTER R. PARKER, *Detroit;* GILES C. SAVAGE, *Nashville;* F. MAYO SCHNEIDEMAN, *Philadelphia;* THEODORE B. SCHNEIDEMAN, *Philadelphia;* GEORGE E. DE SCHWEINITZ, *Philadelphia;* T. H. SHASTID, *Superior, Wis.;* CHARLES P. SMALL, *Chicago;* A. C. SNELL, *Rochester, N. Y.;* GEORGE W. SWIFT, *Seattle;* D. L. TILDERQUIST, *Duluth;* WILL WALTER, *Chicago;* JOHN E. WEEKS, *New York;* WM. ZENTMAYER, *Philadelphia;* CHARLES ZIMMERMANN, *Milwaukee. Foreign:* SIR JAMES W. BARRETT, *Melbourne, Australia;* MARCEL DANIS, *Brussels, Belgium;* ENRIQUE B. DEMARIA, *Buenos Aires, Argentina;* ROBERT HENRY ELLIOT, *London, England;* JULIUS FEJER *Budapest, Hungary;* J. SANTOS FERNANDEZ *and* F. M. FERNANDEZ, *Havana Cuba;* J. DE J. GONZALES, *Leon, Mexico;* H. J. HOWARD, *Peking, China;* M. LANDOLT, *Paris, France;* J. KOMOTO, *Tokyo, Japan;* ARTHUR F. MACCALLAN, *Cairo, Egypt;* F. P. MAYNARD, *Crewe, England;* E. E. MONTAÑO, *Mexico City;* SPECIALE CIRINCIONE, *Rome, Italy;* FREDERICK C. TOOKE, *Montreal, Canada.*

Annual Subscription Ten Dollars in Advance,
Single Copies One Dollar.

PUBLISHED MONTHLY BY THE OPHTHALMIC PUBLISHING COMPANY
7 West Madison Street, Chicago, Illinois.

Entered as Second Class Matter January 1st, 1918, at the Post Office, Chicago, Ill., under the act of March 3rd, 1879.

JUST as "follow through" is an important part in the execution of your golf stroke, so it is equally important to us in fulfilling your prescription requirements.

Never satisfied merely to start your jobs in our shops, we follow them each step of the way through many operations. Inspection after inspection is given each lens, and three inspections of the frame measurements insure accuracy to an uncommon degree.

Each and every pair of glasses is as carefully done as if it were the only one to be made up each day.

Scientific perfection is the natural result. Your most exacting prescriptions come back to you, promptly and properly interpreted into an article of merit such as you want to represent your professional skill.

Your work is solicited because of our desire and ability to serve you better.

RIGGS OPTICAL COMPANY

Exclusively Wholesale

OMAHA	KANSAS CITY	PORTLAND	SEATTLE
SIOUX CITY	OKLAHOMA CITY	SAN FRANCISCO	LOS ANGELES
CEDAR RAPIDS	WICHITA	SALT LAKE CITY	SPOKANE
QUINCY	LINCOLN	OGDEN	TACOMA
WATERLOO	HASTINGS	DENVER	HELENA
MADISON	SIOUX FALLS	PUEBLO	BOISE
MANKATO	PITTSBURG, KAS.	FARGO	POCATELLO
FORT DODGE	GREEN BAY	APPLETON	SALINA
		GREAT FALLS	

FIG. 1.
CASE I.
RIGHT EYE.

FIG. 2.
CASE II.
LEFT EYE.

RUPTURE OF THE CHOROID. (LAMB'S CASES)

PLATE VI

AMERICAN JOURNAL OF OPHTHALMOLOGY

Vol. 6 JUNE, 1923 No. 6

RUPTURE OF CHOROID WITH REPORT OF TWO CASES.

H. D. LAMB, M.D.

ST. LOUIS, MO.

This paper gives a general review of lesions of this kind and reports two cases. One was a typical crescentic form situated in the lower external quadrant of the fundus. The second case presented a stellate "rupture" of the choroid, and history of subsequent degenerative change

In speaking of choroidal ruptures it is necessary to distinguish between direct ruptures which occur at the point of contact of a blunt object striking the eyeball, and indirect ruptures which lie in places away from the point of contact, most commonly in the posterior part of the globe. Those belonging to the second group are the more frequent and the more interesting. In some cases both kinds of choroidal ruptures have occurred in the same eye.

To von Graefe[1] belongs the credit of first reporting a case of indirect choroidal rupture. In 1854, in the first volume of his famous Archives, he described two cases of choroidal rupture, and pointed out that the choroid could be separately torn without any external wound.

In the Franco-German Wars of 1870-71, there were many choroidal ruptures as the result of gunshot injuries. The frequency of choroidal rupture has been found by several estimators to be about one in every one thousand patients. According to Wagenmann[2] in the Graefe-Saemisch, Eisenhuth in 1899 reported thirty-nine ruptures in seventy thousand patients, and d'Oench gathered sixty-nine among one hundred and fifty thousand patients extending over a period of thirty-three years.

Many cases of choroidal ruptures occurred in the recent war, as reported by Lagrange[3], von Szily[4], Lister[5] and de Schweinitz[6].

Ohm[2a] in 1905 assembled three hundred and sixteen cases of choroidal rupture reported in the literature. This must have represented a very thoro gleaning. Since 1905 there have been published sixty cases more, making three hundred and seventy-six cases of choroidal ruptures published, to date, in the literature; these figures of course are but approximate.

DIRECT CHOROIDAL RUPTURES.

The direct choroidal rupture, occurring at the point of contact of the damaging object with the eye, is located as a rule in relation with the anterior part of the sclera. An irregular wide tear in the choroid is usually produced, thru which the sclera shows bluish-white. The scar with which it heals has an intensively white or bluish-white color.

INDIRECT CHOROIDAL RUPTURES.

The indirect choroidal ruptures are caused most frequently by blunt objects, either struck, thrown or shot, which encounter the eyeball anteriorly with strong force. Most commonly among such objects are reported tennis balls, corks flying out of bottles, shot, pieces of wood or iron, whiplash, pencils, etc. Gunshot injuries of the bones of the face and the skull without opening the orbit, also projectiles which transverse the orbit behind the eye without touching the eyeball, have been observed to be accompanied by rupture of the choroid. They can occur as well as the result of marked concussions in the vicinity of the eye. Rarely has choroidal rupture been observed occurring after a general shaking up of the body, and after a fall or collision of the body.

Hughes[7] in 1887, among seventy-two choroidal ruptures collected from the literature, found 82% lying on the tem-

poral side of the fundus, 14% on the nasal and 4% horizontal. Of Ohm's[2a] three hundred and sixteen cases of choroidal rupture, there were definite data in two hundred and seventeen cases. This author found of this number 65% temporal ruptures, 10% extending downward, 6% extending upward, 23% of all the ruptures lay in the macular region and 19% were oval. In six cases the ruptures encircled the papilla completely, or almost completely. The same author reported 67% percent of the choroidal ruptures he investigated were single, 19% double, 7% triple, 4% quadruple and 5% still more multiplied.

The usual form of choroidal rupture is sickle shaped, about three to five times the width of the papilla in length, and having a breadth of one-third to one-half the width of the papilla. Atypical conditions are mainly confined to the form of the tear, which may be three to four times the width of the optic nerve and very much longer. Mannhardt[8] reported an enormous rupture which occupied the entire posterior portion of the fundus.

v. Wecker[2b] has stated that in fresh cases of choroidal rupture, where hemorrhage in or on the choroid and edema of the retina does not obscure the rent, the latter appears white when the lamina fusca remains unbroken and in connection with the sclera, and not bluish, which is the case when the sclera itself is uncovered in the line of the rupture. The same author first stated, also, that the outer layers of the retina and particularly the pigmented epithelial layer are almost always torn in choroidal rupture. Of course any loss of continuity in the pigmented epithelial layer means a loss of function for that portion of the fundus, and a corresponding scotoma in the field of vision. Where the pigmented layer is not injured, loss of vision occurring later is due to interference with the nutrition of the retina, particularly of the macula, from connective tissue forming in the choroid.

After the tear in the choroid commences to cicatrize, it may be observed from time to time to grow smaller. Large tears very seldom come together, smaller ones more commonly. Würdemann[9] said that if increase of vision occurs, if the choroidal tear comes entirely together and if the retina is not affected, which is only occasionally observed, sight may fully return, but as a rule the retina even then becomes atrophic and the sight declines. Nevertheless, there have been several cases reported where the vision entirely returned. Where the tear completely or almost completely surrounds the papilla, total blindness results from optic atrophy, caused by disturbance to the nutrition of the retina.

The first anatomic description of a choroidal rupture was published by v. Ammon[10] in 1854, a few months after v. Graefe's first reference to this class of injuries. The first observations to be made histologically on a recent choroidal rupture were reported by Alt[11] in 1897. The eye in this case had been removed by a general surgeon from a boy of eighteen years, who had accidentally shot himself in the head with a revolver three days before; the bullet had slightly injured the roof of the orbit. Numerous ruptures of the choroid and retina were found. The simplest form of rupture of the choroid which Dr. Alt observed was a tear thru the lamina vitrea and the pigmented epithelium. This was followed or perhaps preceded by a hemorrhage which lifted up a small fold of retina. The larger the tear and the more the blood extravasated under the retina, the greater was the alteration by pressure in the structure of the retina. In one place a rupture had taken place thru the whole thickness of the choroid; the gap resulting in this manner was filled and covered over by retinal tissue. At the edge of this tear, the retraction of the choroidal wound lips was plainly shown by the wavy line formed by the relaxed lamina vitrea. The pigment epithelium seemed to be proliferating, and new unpigmented cells were situated in the folds of the lamina vitrea. The retinal tissue covering the gap had lost all its characteristic features, appearing as a loose more or less laminated connective tissue, in which

were imbedded a number of round cells and cells carrying pigment.

Ginsberg[12] has given us the microscopic findings in a rather typical case of old choroidal rupture, the eye examined having been struck with a rock eleven years before. Ophthalmoscopically there had been found in the vicinity of the papilla a bluish colored focus about three times as long as the width of the papilla and half as broad, having a black pigmented margin. Microscopically the scar was seen to consist of indurated connective tissue in which pigmented epithelial cells were buried. The previously normal retina was here reduced to a thin fibrous membrane, which had grown together with the scar tissue. The papilla showed excavation.

Many views have been advanced to explain the mechanism of indirect rupture of the choroid. These different opinions are briefly discussed by Parsons[13]. Kern, v. Seidlitz, Knapp and Aub attribute the cause to contrecoup; Becker, to an invagination of the optic nervehead by the blow. Saemisch and de Wecker consider that the fixing of the choroid to the sclerotic by the posterior ciliary vessels may be an important factor; v. Arlt advanced the view that flattening of the globe by the blow causes stretching of the choroid, which gives way at right angles to the direction of extension and at the site where it is less firmly attached to the sclera. Berlin, Geissler and Hirschberg thought that the rupture was caused by forcing the globe against Tenon's capsule and the orbital contents. Hülse attributed the size and shape of the tear to contraction of the ciliary muscle; Franke conjectured that the recoil after the blow acts least on the parts surrounding the optic nervehead and thus causes the rupture. Hughes, v. Michel and Parisotti think that where the blow is directed tangentially, the eye will rotate whilst the intraocular pressure is simultaneously raised; the rotation is stopped by a sudden jerk when the optic nerve is put on a stretch; the escape of the retina is attributed to its greater elasticity.

Wagenmann[2] in addition summarizes the view of Stoewer, Haas and Lohmann. Stoewer considered the cause to lie in the comparative inelasticity of the choroid; that is, when the eyeball was flattened by a blow, the choroid, because of its inelastic lamina vitrea, could not keep up with the sclera in its stretching and tore, unlike the retina which was able to distend sufficiently. Several experimentors have attempted to produce indirect choroidal ruptures in living animals' eyes. Two, v. Seidlitz[26] and Berlin,[24] using rabbits, succeeded repeatedly.

The two cases of indirect choroidal rupture I propose to briefly report might be called the opposite extremes of the stellate form. Wagenmann[2] states that choroidal ruptures running concentric to the papilla occur when a force with a broad point of contact has operated from anteriorly, while the irregular running and irregular shaped ruptures follow blows occurring from the side, and those with small points of contact as from grains of shot.

Case 1. E. W. P., 37 years old, patient of Dr. F. E. Woodruff, was struck in the right eye by a piece of metal cut off by a cold chisel. The wound in the sclera, having a bead of vitreous presenting, was situated 3 mm. beyond the limbus in the lower outer quadrant; repeated X-rayings were negative. Vision was 10/240 in this eye and normal in the left eye. Ophthalmoscopic examination of the fundus showed a large area of retinal edema, choroidal hemorrhage and exudate just external to the optic nerve. Occupying the lower external quadrant of the fundus and extending from the disc to a width of about one and one-half times that of the papilla, there could be seen a serous exudate under the retinal pigment epithelium, appearing a dark greyish color. Just beyond this area there was a very dark crescentic linear area of irregular width, from one-fourth to one-half the width of the disc, and in length four times the width of the disc, with its upper end covering the macula. Going still more temporally, there was revealed a rather extensive sheet of hemorrhage, apparently subretinal. The latter ended externally in a distinct line crescentic with the disc. The

hemorrhage and exudate slowly absorbed, until on January 28, 1922, there could be plainly made out the stellate rupture as illustrated in Figure 1. Final vision was 10/240, unimproved with lenses. See Plate VI, Fig. 1.

CASE 2. A boy, nine years old, entered the Missouri School for the Blind last year, under the service of Dr. J. W. Charles, Oculist for the School. This patient had been injured in both eyes 18 months before, by the explosion of a dynamite cap, with which he had been playing. The eye specialist under whose excellent care the lad came on the day following the accident, very kindly sent me a copy of his notes on the case, from which I have extracted the following abbreviated data:

The right eye, showing an irregular horizontal wound 5 mm. long thru the cornea and sclera at the superior limbus, became infected intraocularly and was enucleated four days after the accident. No X-ray was used, but attempt with magnet was negative. The left eye, when first seen, showed a small marginal cut in the central portion of the upper lid; also imbedded in extreme upper central portion of bulbar conjunctiva was a small dark foreign body. Media and fundus were normal, with no evidence of a penetrating wound; vision 20/21 (pictures); no X-ray. Under cocain hydrochlorid 5%, there was removed from the bulbar conjunctiva a thin scale like piece of jagged metal, measuring 2 mm. x 3 mm. in its greatest diameters. No irritation of the globe was present at any time. Five weeks after the accident the vision was still 20/21 in the eye. He was not seen again until two months later, or about three months from the time of the accident; the father stated at this visit that the child had not been seeing well for the preceding two weeks. Examination revealed vision 20/120. The lower central portion of the retina showed a greyish mass, which projected into the vitreous. The same conditions prevailed at visits six months and nine months after the injury, after which he was not seen by this specialist.

Examined by Dr. J. W. Charles and myself, at the Missouri School for the Blind 18 months after the accident, the eye showed ophthalmoscopically the picture as illustrated in Fig. 2. Vision was still 20/120, but could be improved by a lens (+ 5.00 D. Sph. ⊃ — 3.00 D. Cyl. ax. 135°) to 20/35. He was consequently sent home and recommended to go to the regular sighted school. Plate VI, Fig. 2.

Somewhat similar to the form of choroidal rupture pictured in Fig. 2 is the one described by Mannhardt[8] and another reported by Duclos.[14] Each of these authors described a linear choroidal tear, extending from the temporal side, another from the nasal side of the disc, to the farthest limits of the fundus visible with the ophthalmoscope. In Mannhardt's case the rupture passed obliquely across the entire fundus, from up and inward to down and outward; whereas in Duclos' patient the rent passed almost exactly horizontally across the entire ophthalmoscopic field.

BIBLIOGRAPHY.

1. v. Graefe. Two cases of Choroidal Rupture. Archiv f. Ophtal., 1854, i, 1, p. 402.
2. Wagenmann. Choroidal Ruptures. Graefe-Saemisch, Handbook of Ocular Disease, 2 Auflage, ix Band, 5 Abt., xvii Kapital, p. 515.
2a. Ohm. Abstracted in Wagenmann's (2) Review.
2b. v. Wecker. Abstracted in Wagenmann's (2) Review.
2c. v. Seidlitz. Abstracted in Wagenmann's (2) Review.
2d. Berlin. Abstracted in Wagenmann's (2) Review.
3. Lagrange. Ophthalmoscopic Atlas of the War, 1918, p. 35.
4. v. Szily. Ophthalmoscopic War Atlas, 1918.
5. Lister. War Injuries of the Eye, Lancet, 1918, 2, p. 67.
6. de Schweinitz. Concussion and Contusion Injuries of the Eye. Amer. Jour. Ophthal., 2, 1919, p. 313.
7. Hughes. Formation of Scleral and Choroidal Ruptures. Archiv f. Ophthal., 1887, xxxiii, 3, p. 21.
8. Mannhardt. Rupture of the Choroid. Klin. Monatsblätt. f. Augenheilk., 1875, xiii, p. 132.
9. Würdemann. Injuries of the Eye, 1912, p. 593.

10. v. Ammon. The Disappearance of the Iris thru Depression. Archiv f. Ophthal., 1854, i, 2, p. 121.
11. Alt. On the Histology of a Case of Sudden Blindness Caused by an Injury to the Skull. Ophthal. Review, 1897, p. 289.
12. Ginsberg. Anatomic Findings in an Old Healed Choroidal Rupture. Archiv f. Ophthal., 1897, xliv, 1, p. 26.
13. Parsons. The Pathology of the Eye, 1908, iv, p. 1151.
14. Duclos. A Case of Double Circular Rupture of the Choroid. Annal. d'Oculist, 1897, cxviii, p. 427.

THE EFFECT OF INTENSITY OF STIMULUS ON THE SIZE AND SHAPE OF THE COLOR FIELDS AND THEIR ORDER OF RANKING AS TO BREADTH.

DR. C. E. FERREE AND DR. G. RAND.

BRYN MAWR, PA.

The influence of illumination on the size and form of the color fields is here shown. The charts here reproduced were made by illumination varying from 0.03 to 51 foot candles. Comparison with the illumination of a well lighted room showed it was equal to 51 foot candles at 1 p. m., and 3 foot candles at 4.15 p. m. on a bright winter day. Such variations in the light produced changes in the field for red by amounts ranging in different meridians from 11° to 37°; for blue of 13° to 37° and for green 10° to 19°.

In a previous paper[1] the effect of changes in the intensity of the stimulus light on the size and shape of the color fields and their order of ranking as to breadth was discussed, and an explanation was found for these effects in the

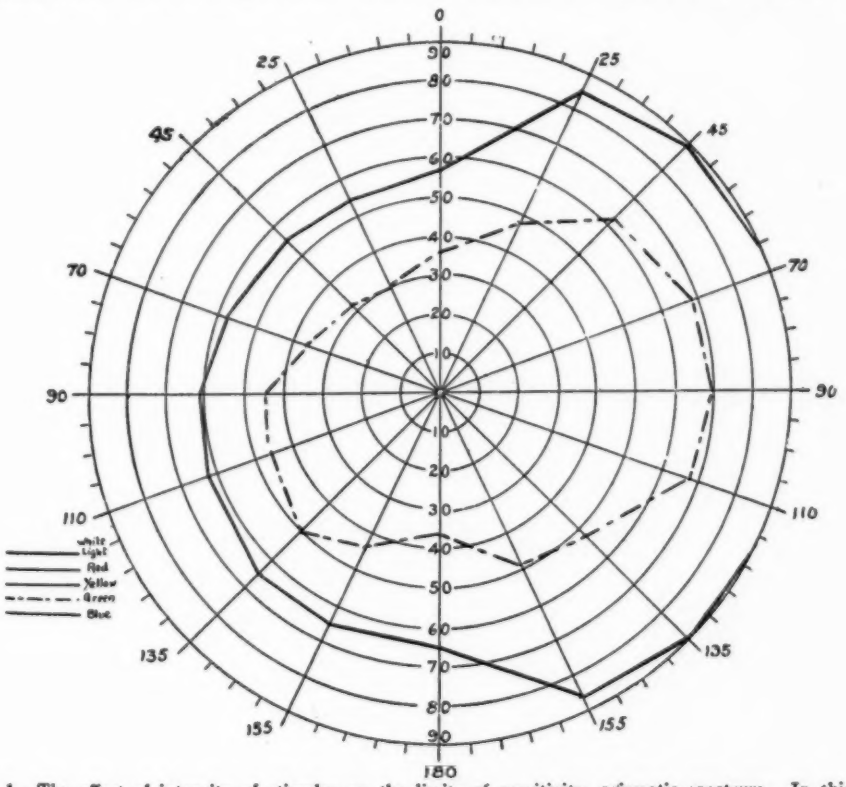


Fig. 1.—The effect of intensity of stimulus on the limits of sensitivity, prismatic spectrum. In this chart are represented the limits of sensitivity for intensity A: red, 9096.639; yellow: 4065.624; green, 1526.388; and blue, 882.025 watt x 10^{-10}.

The above values represent total energy at the stimulus opening in the campimeter and at the eye. The energy density at the stimulus opening (watt per sq. mm.) may be obtained by multiplying the above values by 0.005659; the energy density at the eye, by multiplying them by 0.303.

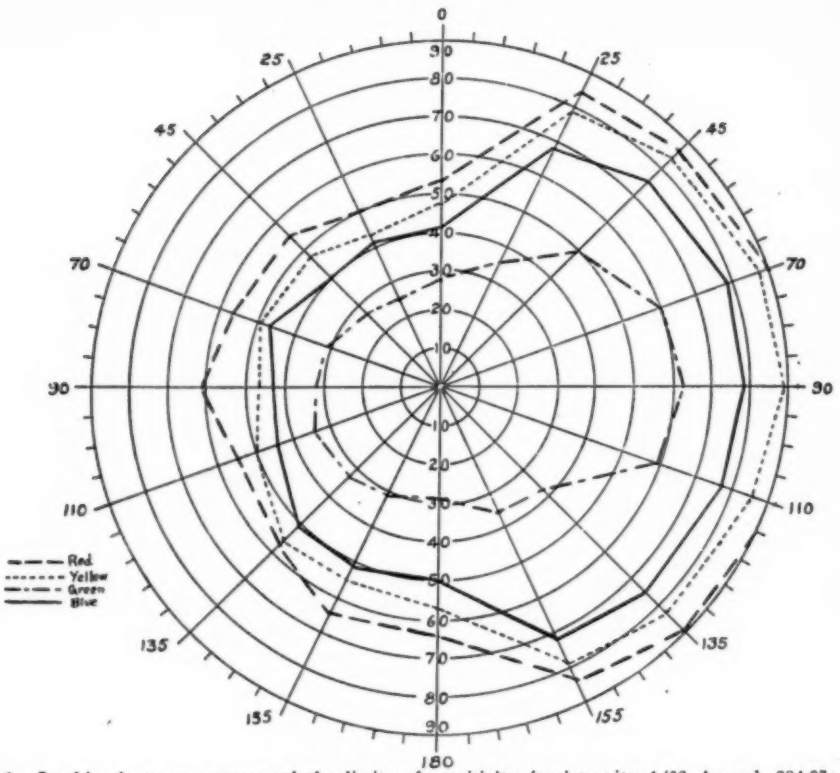


Fig. 2.—In this chart are represented the limits of sensitivity for intensity 1/32 A; red, 284.27; yellow, 127,051; green, 48,825, and blue, 27.563 watt x 10^{-10}.

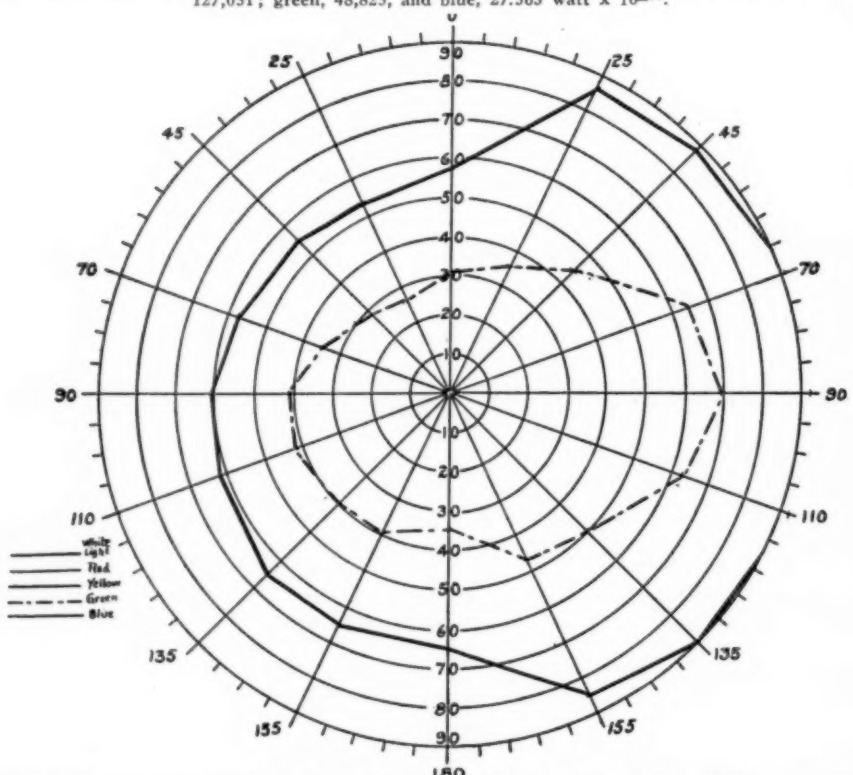


Fig. 3.—In this chart are represented the limits of sensitivity B: red, 891.05; yellow, 882.51; green, 884.946; and blue, 882.025 watt X10^{-10}.

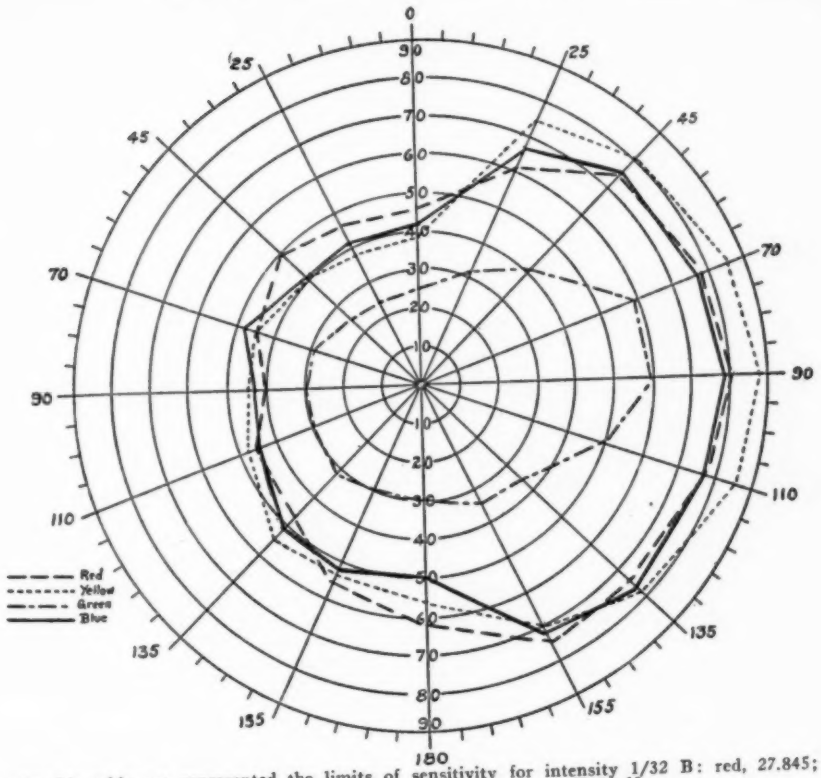


Fig. 4.—In this table are represented the limits of sensitivity for intensity 1/32 B: red, 27.845; yellow, 27,578; green, 27.655, and blue, 27.563 watt X 10^{-10}.

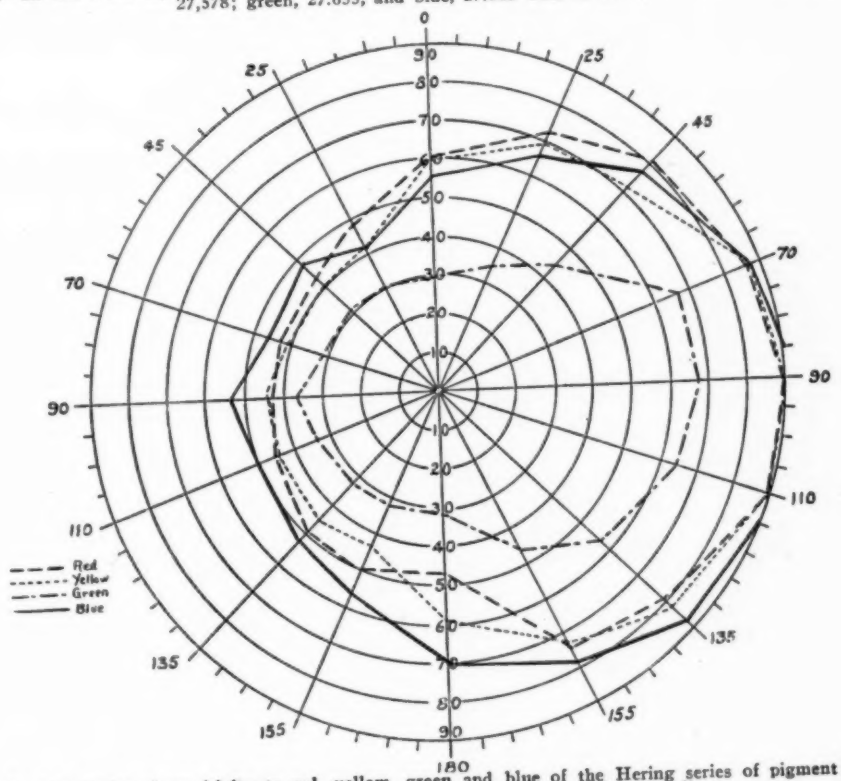


Fig. 5.—The limits of sensitivity to red, yellow, green and blue of the Hering series of pigment papers, intensity of illumination, horizontal component, 130 foot candles.

irregular distribution of color sensitivity over the retina of the normal eye. Four curves were given illustrating this irregularity of distribution, in terms of the amount of light required just to arouse the color response at near lying points from the center to the periphery of the retina. Briefly summarized the situation is as follows:

(1) The sensitivity to a given color falls off towards the periphery at different rates in the different meridians; therefore, a decrease in the intensity of the stimulus light causes the field to contract by different amounts in the different meridians, or to change its shape. (2) At some points (or rather over some regions) in the periphery of the retina, the sensitivity to red is greater than to blue, and at others in the same meridian the reverse of this is true. Because of this fact, a reversal of the order of ranking of the fields as to breadth occurs as the result of a change of the intensity of the stimulus light, a change which is frequently no greater than is produced by the variations in the daylight illumination of a well lighted room during the working hours of a single day.

In the present paper, maps will be given showing the effect of changes in the intensity of the stimulus light on the color fields. Results will be included for two sets of conditions: high intensities, the fields having been taken with a rotary campimeter[2] designed especially for the use of spectrum lights over a wide range of intensities; and medium and low intensities, the fields having been taken with the clinic perimeter[3] described in an earlier paper, designed for the use of pigment stimuli under controlled illumination.

COLOR FIELDS WITH SPECTRUM AND PIGMENT STIMULI AT HIGH INTENSITIES.

In this series of determinations, five intensities of light were used: the prismatic spectrum of a Nernst filament operated by 0.6 ampere of current, intensity A (Fig. 1); the colors of this spectrum reduced to 1/32 of their original intensity, 1/32 A (Fig. 2); an equal energy spectrum in which the colors used were all made equal in physical intensity to the blue (the color of least energy of the series which we have called intensity (A), intensity B (Fig. 3); the colors of this series reduced to 1/32 of their original intensity, intensity 1/32 B (Fig. 4); and the Hering standard pigments: red, yellow, green and blue illuminated by 130 foot candles of light, horizontal component (Fig. 5).

For the spectrum stimuli, narrow bands in the region of 670 $\mu\mu$., 581 $\mu\mu$., 522 $\mu\mu$. and 481 $\mu\mu$. were used. The breadth of the analyzing slit used to isolate these bands was maintained at 0.5 mm. The ranges of wave length obtained were approximately 680-660 $\mu\mu$., 587-575 $\mu\mu$., 526-518 $\mu\mu$., and 474-468 $\mu\mu$. The spectrum was gotten and the different wave lengths were presented to the eye by means of the apparatus described in the Journal of Experimental Psychology, 1916, I, pp. 247-284: "A Spectroscopic Apparatus for the Investigation of the Color Sensitivity of the Retina, Central and Peripheral."

In every case the light was examined for impurities at the analyzing slit by means of a small Hilger direct vision spectroscope provided with an illuminated scale. When found, impuritise were absorbed by thin gelatin filters, selected so as to cut out as little of the useful light as was possible. These gelatines were placed over the analyzing slit and were held in position by short clips fastened to the front surface of the jaws, the edges of which formed the slit. The presence of alien visible wave lengths affects the results of any determination of color sensitivity in two ways: (a) Thru physiologic inhibitions and interactions they decrease the amount of the color response. The effects of the presence either of complementary or noncomplementary wave lengths is to exert a canceling or inhibiting action on the chromatic response, the action of the former being, of course, the greater. And (b) they increase the values of the energy or other type of measurement of the amounts of light employed. This has the effect of correlating the sensation aroused with a higher intensity of light than is effective for sensation.

Other precautions exercised to control the influence of variable factors were as follows: (1) The determinations were made with the preexposure and surrounding field of the same brightness as the stimulus color at the limits of sensitivity. (2) The intensity of the general illumination was held constant at 30.5 foot candles horizontal component, for the spectrum colors and 130 foot candles for the pigment papers. The work was done in an optics room designed especially for the control and uniform distribution and diffusion of daylight illumination. (3) The amount of light entering the eye was made independent of variations in the size of the pupil. Such control is very easy to accomplish with the means of presenting the light to the eye used in the apparatus employed. That is, by means of the optical system of this apparatus, the light from the spectroscope was first collimated and then focused on the eye, forming an image of the analyzing slit in the pupil and causing the stimulus opening in the campimeter screen to appear to be uniformly filled with light. All that was needed therefore to maintain the amount of light entering the eye at a constant value was to keep this image always of the same size and smaller than the pupil. The stimulus opening of the campimeter screen formed a visual angle of 3°26′ at the eye. (4) The correctness and constancy of the position of the head was secured by the biting of a mouth board, the position of which for the exact location of the eye at the center of the system had previously been determined by a convenient appendage to the apparatus described in the articles referred to.

The fields are shown in Figs. 1-5. At intensities A and B (Figs. 1 and 3), it will be noted that the limits for red, yellow and blue coincide with the limits of white light vision. Green could not be made to have so wide an extent. At intensity 1/32 A, the fields in the order from widest to narrowest are red, yellow, blue and green. That is, at intensities of this order of magnitude, with the distribution of energies found in the prismatic spectrum of a Nernst filament, the limits are concentric, with both red and yellow outside the blue. At intensity 1/32 B, the limits for red, yellow and blue interlace or crisscross. This, it will be remembered, is a spectrum in which the four colors had been made equal in energy to the blue of the preceding spectrum, 1/32 A. That is, 1/32 A with its four colors equalized at the intensity of the blue gave interlacing limits for red, yellow and blue, not concentric in the order from widest to narrowest of red, yellow and blue.

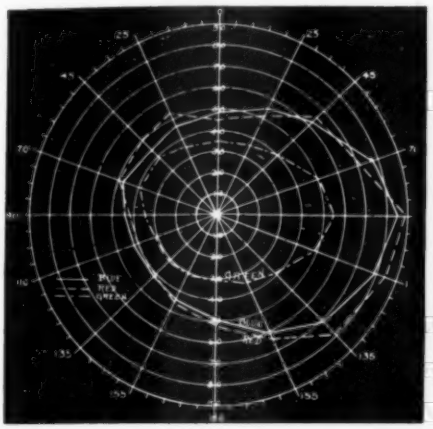


Fig. 6.—Fields taken under 51 foot candles of light, an illumination equal to the daylight falling on the perimeter at the fixation point when facing a window on a bright day, 1 p. m., Jan. 14, 1921.

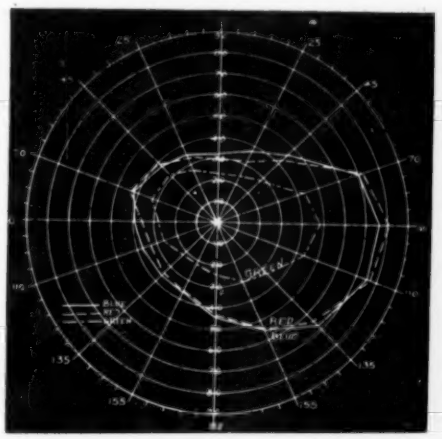


Fig. 7.—Fields taken under 17 foot candles of light, an illumination equal to the daylight at the fixation point, on the same day at 2:30 p. m., perimeter facing window; or at 11 a. m., perimeter parallel to window.

The Hering pigment stimuli under the intensity of illumination used, 130 foot candles, horizontal component, also gave interlacing limits for red, yellow and blue, with fields roughly comparable in breadth with those given by the spectrum colors at intensity 1/32 B. A comparison of this result with the results of the next section of the paper shows that the Hering pigment stimuli gave interlacing limits with the same eye under 130, 53, 17 and 7 foot candles of light, horizontal component, altho the limits for blue tended progressively to pass within the limits for red as the illumination was decreased. At 3 foot candles the limits were concentric for all but one point, where they were coincident, with the blue field wider than the red. At 0.03 foot candles they had reversed for the greater part of the field, the limits for blue lying outside of the limits for red.

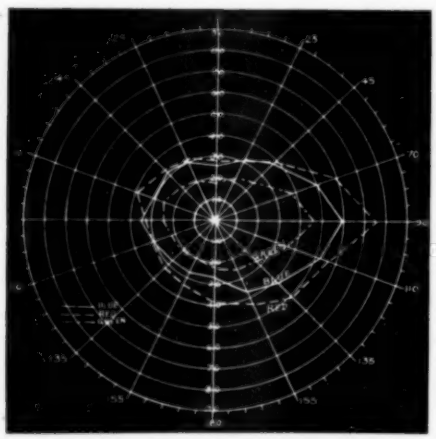


Fig. 8.—Fields taken under 7 foot candles of light, an illumination equal to the daylight at the fixation point, on the same day at 3:45 p. m., perimeter facing window; or at 1:30 p. m., perimeter parallel to window.

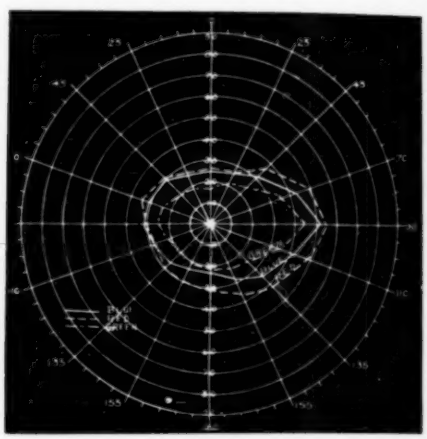


Fig. 9.—Fields taken under 3 foot candles of light, an illumination equal to the daylight at the fixation point, on the same day at 4:15 p. m., perimeter facing window; or at 2:30 p. m., perimeter parallel to window.

THE COLOR FIELDS WITH PIGMENT STIMULI UNDER MEDIUM AND LOW INTENSITIES OF ILLUMINATION.

In this series of determinations, five intensities of light reflected from pigment stimuli were used: the Hering standard pigments under 51, 17, 7, 3 and 0.03 foot candles of light. In order to show how these illuminations compared with the daylight illumination falling on the perimeter arm in an ordinary room, measurements were made of the daylight at the level of the perimeter in a room 30 ft. long with a row of six windows, southern exposure, the lower sills of which were somewhat higher than the perimeter arm. The measurements were made directly in front of one of these windows on a bright day, Jan. 14, 1921. It was found that our highest intensity of illumination, 51 foot candles, was the same as that falling on the perimeter arm at the fixation point with the arm facing the window at 1 P. M.; our second highest illumination, 17 foot candles, was the same as that falling at the fixation point at 2:30 P. M.; the third highest illumination, 7 foot candles, the same as that falling on the fixation point at 3:45 P. M.; and the fourth, 3 foot candles, the same as that falling at the fixation point at 4:15 P. M.

Measurements were made also with the perimeter placed parallel to the window. Our second illumination, 17 foot candles, was the same as that falling at the fixation point at 11 A. M.; our third illumination, 7 foot candles, the same as that at 1:30 P. M.; and our fourth illumination, 3 foot candles, the same as that at 2:30 P. M.

In order to secure the intensities of illumination employed in these experi-

ments, neutral filters of the desired coefficient of transmission were inserted in the aperture of the lamp house provided for the illumination of the perimeter arm. The measurements of the illumination were made as follows: A test plate covered with magnesium oxid deposited from the burning metal was substituted for the stimulus card at the fixation point, and its brightness was measured under the different intensities of light with a Sharp-Miller illuminator. From these brightness measurements, in candles per square foot, the value of the incident light in foot candles was computed. The fields were taken with all of the controls described in our previous paper.[8] They are shown in Figs. 6-11.

The decrease of illumination from 51 to 3 foot candles narrowed the limits for red by amounts ranging in the different meridians from 11 to 37 degrees; for blue, from 13 to 37 degrees; and for green from 10 to 19 degrees, a result, it will be remembered, which was produced by a change of illumination equal to that which occurred from 1:00 to 4:15 P.M. in a well lighted room on a bright winter day. The decrease of illumination from 51 to 0.03 foot candle narrowed the limits for red by amounts ranging in the different meridians from 27 to 72 degrees; for

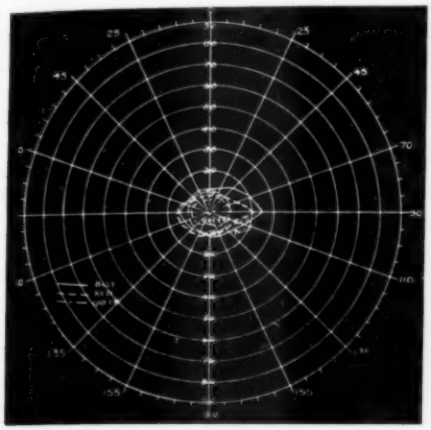
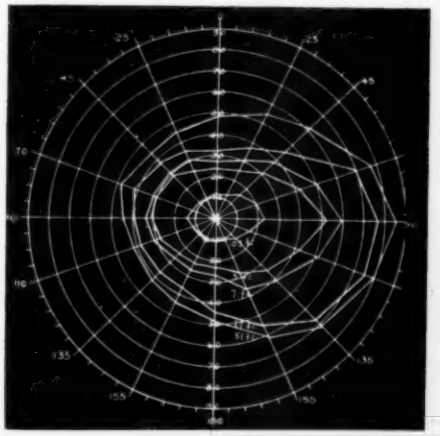
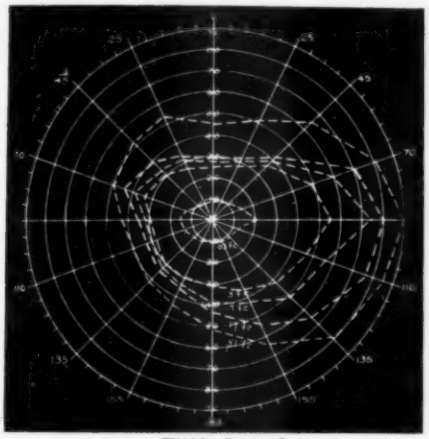


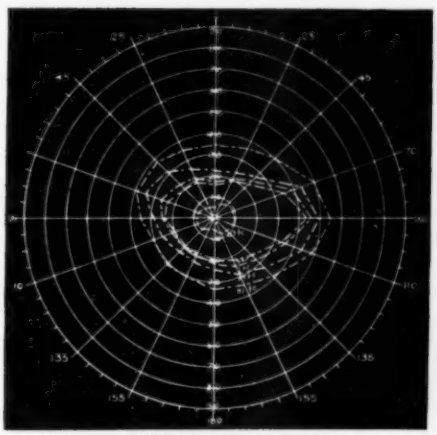
Fig. 10.—Fields taken under 0.03 foot-candles of light.



Fields for blue.



Fields for red.



Fields for green.

Fig. 11.—Showing variations in both the extent and shape of the color fields when taken under 51, 17, 7, 3, and 0.03 foot-candles of light.

blue, from 29 to 61 degrees; and for green, from 22 to 45 degrees.

The somewhat radical change in the shape of the fields will be noted too for the change of intensities employed; also the change in the relative breadths of the fields. At 51 foot candles of light on the perimeter arm, the boundary of the blue field intersected the boundary of the red field seven times; at 17 foot candles, four times; at 7 foot candles, three times; and at 3 foot candles, it lay entirely within the boundary of the red field, with the exception of at one point, where it was approximately coincident with the limit for red. At 0.03 foot candle, the reverse of this was true for the greater part of the field; that is, the limits for blue lay outside of the limits for red.

It will be seen from the charts in these two sections how little dependence can be placed on breadth or shape of field and order of ranking as to breadth, either in diagnosis or in checking up the advance or recession of a pathologic condition, unless greater precautions are taken for the control of the intensity of the stimulus light, than are possible under the conditions which ordinarily prevail in office and clinic work. Contractions, changes in shape, reversals, spiral fields, etc., may and doubtless do occur, as the result of changes which take place in the daylight illumination of the room in which the fields are taken. Until some means is adopted for general use in the practice of field taking which provides for a constant illumination of the stimulus at every point at which it may be placed in taking the field, not even the first step needed in the systematic application to diagnosis can be taken, namely, an agreement within reasonably satisfactory limits as to what are the normal fields. That the practice of field taking should have been continued so long, in spite of the uncertain and variable results which have been obtained, is, however, a matter of no small significance and encouragement. It is a strong testimonial to the belief in the fundamental importance of field taking in the study of eye diseases.

REFERENCES.

1. Perimetry. Variable Factors Influencing the Breadth of the Color Fields. Amer. Jour. Ophthal., 1922, v. 5, pp. 886–895.
2. Description of a Rotary Campimeter. Amer. Jour. Psychol., 1912, xxiii, pp. 449–453; also A Spectroscopic Apparatus for the Investigation of the Color Sensitivity of the Retina, Central and Peripheral. Jour. Exper. Psychol., 1916, i, pp. 247–284.
3. An Illuminated Perimeter with Campimeter Features. Amer. Jour. Ophthal., 1922, v, p. 455.

INTERSTITIAL KERATITIS DUE TO FOCAL INFECTION.

CLARENCE PORTER JONES, M.D., F.A.C.S.

NEWPORT NEWS, VIRGINIA.

This is the case of a boy of 16 who had parenchymatous inflammation of the cornea, progressive until after six months of active antiluetic and other treatment, both corneas were entirely opaque, but not vascular. Nine teeth showing apical abscesses were removed and also infected tonsils. In all streptococcus hemolyticus was the chief organism. Improvement began within 48 hours, and in 8 months the corneas were clear with standard vision in each eye.

The usual teaching in our medical schools has been that interstitial or parenchymatous keratitis is generally syphilitic in origin, regardless of the circumstances under which it may occur. Sir Jonathan Hutchinson, as late as 1889, insisted that it was impossible to have the typical disease as a result of anything but syphilis.

In consulting the standard text books in use at the present time, we find that Fuchs[5] gives syphilis as the principal cause of interstitial keratitis, tho he admits that tuberculosis might be an etiologic factor. Ball[1] states that syphilis is the usual cause of this disease, but expresses the opinion that it might be produced by herpes zoster ophthalmicus. While assigning to syphilis the chief role in the production of this condition, de Schweinitz[3] adds as possible causes, tuberculosis, malaria, rickets, leprosy, the climacteric and depressed nutritional states. In none of these text books is focal infection given as a cause of interstitial keratitis. Likewise, in a personal search of the literature the writer has found no instance in which this eye condition is attributed to a focus of infection, tho several writers throw some light on the subject.

Blum[2] reports a case of keratitis in which there was an associated dental caries, while Terson[10] describes a case of ulcer of the cornea apparently due to the same cause. A case of interstitial keratitis is recorded by Williams[12], which he believes was due to autointoxication. Risley[8] cites three cases in which he believes deficient glandular secretion was responsible for the presence of parenchymatous keratitis. In 1888 Marlow[7] placed on record a case of corneal haze and iritis evidently due to infected teeth. In my practice I have had three patients in whom iritis was evidently caused by infected teeth. The paucity of recorded cases in which interstitial keratitis has been definitely proved to be due to oral focal infection would seem to warrant the publication of this report.

CASE. The patient, a boy, 16 years of age, was first seen by Dr. D. W. Draper, an able internist, on July 2, 1921, and came under my observation for the first time on March 4, 1922. For the history of the cause during this period I am indebted to Dr. Draper.

History.—The patient has had the usual diseases of childhood: measles, chickenpox and whoopingcough; also influenza in 1918. The boy's father, aged 52, has always been in good health, except for an occasional glycosuria. His mother, aged 51, is in excellent health; has had six children and no miscarriages. The Wassermann test was negative in both father and mother. One child died from ileocolitis at the age of one year; another, at the age of two and a half, from pneumonia; the remaining four are in excellent health, with the exception of the patient, who is the youngest.

Physical Examination.—The patient was a well developed, athletic high school boy, weighing 122 pounds. His heart and lungs were normal; the skin over the entire body was exceptionally free from any mark or blemish, tho somewhat anemic in color; there were no palpable glands and no evidences of nervous disorder. Physical examination was otherwise negative, except for the eye condition. The left eye was red, a dull or brick dust color; there was an imperfect arcus senilis, and photophobia and lacrimation.

Laboratory Tests.—Blood examination showed the hemoglobin much reduced. The blood was negative for the plasmodium of malaria. The Wassermann reaction was negative for both blood and spinal fluid. On the basis of the physical examination and the reduced hemoglobin in the blood, a *diagnosis of anemia* was made and treatment instituted accord-

ingly. The eye condition was considered to be of no special importance, tho dionin and atropin were prescribed and smoked glasses were ordered.

July 28: At this time the "arcus senilis" had contracted and had made vision impossible, except counting the fingers at a distance of three feet. There was an irregular cloudy haze thruout the cornea. The patient was much paler than when first seen, his general condition was poor, and the anemia seemed to be progressing. Altho syphilis had been eliminated, in view of the rapid progress of the lesion and the rapid deterioration in the patient's systemic condition, it was deemed advisable to try antisyphilitic treatment. Neosalvarsan was, therefore, administered at intervals of one week for a period of ten weeks, and iron and cod-liver oil were given in doses as large as were well tolerated.

August 21: The cornea was a dense white, smooth like porcelain, and no trace of pupil or iris was visible, even by the use of a strong oblique beam of light. Photophobia, brick-red conjunctiva and arcus senilis had now made their appearance in the right eye. Because of these findings the patient was examined by an oculist, who declared that, in the absence of tuberculosis and malaria, the keratitis must be of syphilitic origin, and he insisted upon the administration of large doses of mixed treatment, together with weekly injections of neosalvarsan. These instructions were followed.

September 21: The right cornea was opaque, except for a small spot in the center; vision was 20/200. By October 30, the whole right cornea was opaque, thus leaving the boy entirely blind. He was unable to count fingers at a distance of three feet with either eye, and insisted on remaining in a dark room, because of his photophobia, which was intense. The use of yellow oxid of mercury, dionin and atropin, together with the mixed treatment, was continued, but without any perceptible improvement.

March 4, 1922: On this date, when the patient was seen for the first time by the writer, he was pale and appeared to be anemic; his weight was 114 pounds. Photophobia was so intense, that he was unable to open his eyes until after a few drops of a weak solution of cocain had been instilled. It was then found that both eyes presented the same appearance. The conjunctivas were dark pink in color; the corneas were a dense white; the irides were not visible; no blood-vessels could be made out in the cornea. The intraocular tension was 28 millimeters (McLean). The patient stated that he experienced no pain, but that light caused a stinging sensation. Examination of the nose and ears was negative. The eustachian tubes were normal. Roentgenograms of the sinuses revealed no pathology, but those of the jaws showed *apical abscesses in nine teeth.* Macroscopically these diseased teeth seemed to be well developed; their gums showed darker areas than were seen about the neighboring teeth. The tonsils showed pus in the crypts; the nasopharynx contained a small amount of adenoid tissue.

Treatment.—Extraction of the infected teeth and enucleation of the tonsils were advised, but were at first refused by the boy's parents. However, after consultation with Dr. John Dunn, who gave same advice, permission to carry out these procedures was granted.

March 16: The nine diseased teeth were extracted by Dr. R. Cowles Taylor, a dental surgeon, who found an apical abscess in each tooth, as indicated by the roentgenograms.

March 20: The patient's tonsils were enucleated by the writer. Cultures from the teeth and tonsils yielded the same organisms, namely, *streptococcus hemolyticus* (predominating); *micrococcus catarrhalis* (a few); pneumococci (a limited number). Within forty-eight hours after the tonsillectomy, the photophobia had decreased to the extent that the patient could keep his eyes open indoors for the first time in several months. Three days later every vestige of the dark pink color or brick dust redness of the conjunctivae had disappeared.

The following brief notes from the case record show the patient's progress:

March 28: Improvement. There is light perception in the left eye.

April 4: Patient can count fingers with the left eye.

April 25: Vision, left eye, 20/150; patient can count fingers at 5 feet with the right eye.

May 22: Vision, left eye, 20/75; objects can be indistinctly seen with the right eye.

June 25: Vision, left eye, 20/40; right eye, 10/200.

August 2: Vision, left eye, 20/30; right eye, 20/75.

September 10: Vision, left eye, 20/25; right eye, 20/65.

September 14: Patient reentered school.

October 19: Vision, left eye, 20/20; cornea clear; right eye, 20/50.

November 11: Vision in each eye 20/20; cornea clear in each eye, except for a minute nebula, at the upper and outer side of the right cornea, which does not interfere with vision. It was observed that the corneal haze began to clear at the margin and gradually disappeared in the order of its commencement and spread.

The medical treatment employed consisted in the administration of iron, strychnin and arsenic by mouth, a liberal diet and attention to general hygiene. Atropin was given occasionally as a prophylactic against iritis, tho there was never any evidence of this complication. In addition, the administration of tonics, dionin and yellow oxid of mercury were continued thruout convalescence, together with massage of the closed eyes, night and morning. Towels wrung out of hot boric acid solution were applied to the eyes several times daily. As a matter of importance in general hygiene, the patient was compelled to spend much time in the open air, his eyes being protected by amber spectacles when he was in the sunlight.

This case is of interest because of (1) the apparent rarity of interstitial keratitis due to focal infection; (2) the possibility that it may open up a new field for investigation by those who have more abundant clinical material and better facilities for study than the writer; and (3) because it may be found that some of the relapsing cases of keratitis, or those in which blindness has become permanent, may be due to focal infection, either primarily or secondarily.

BIBLIOGRAPHY.

1. Ball, J. M. Interstitial Keratitis, Textbook Oph., p. 321.
2. Blum, Henry W. Keratitis Associated with Dental Caries, Oph. Rec., vol. 25, p. 389.
3. de Schweinitz, Geo. E. Interstitial Keratitis, Textbook Oph., 9th Ed., p. 287.
4. Fox, L. Webster. Interstitial Keratitis, Textbook Oph., p. 141.
5. Fuchs, Ernst. Interstitial Keratitis, Textbook Oph., p. 288, 5th Ed.
6. Jocqs, R. Dendritic Keratitis Due to Carious Tooth, Oph. Year Book, 1910, p. 152.
7. Marlow, F. W. Corneal Haze and Iritis Due to Infected Teeth, N. Y. Medical Journal, April 14, 1888.
8. Risley, S. D. Etiologic Factors in Interstitial Keratitis, Oph. Rec., July, 1908.
9. Stephenson, Sydney. Interstitial Keratitis, with Especial Reference to Pathogenesis and Treatment, Ophthalmoscope, Feb., 1909.
10. Terson. Corneal Ulcer Healed Promptly by Extraction of Tooth, Clin. Oph., vol. 17, p. 547.
11. Weeks, John E. Interstitial Keratitis, Textbook Oph., p. 290.
12. Williams, H. B., Jr. Interstitial Keratitis Due to Autointoxication, Jour. O. and O.-L., August, 1909.

OCULAR INFLAMMATIONS THE RESULT OF DISTANT FOCAL INFECTION.

JOHN DUNN, M.D.

RICHMOND, VIRGINIA.

Attention is called to the wide range of these inflammations illustrated by acute iritis, iridocyclitis, chronic uveitis, keratitis, chronic conjunctivitis and inflammatory ectropion. In acute cases, removal of the responsible focus of infection was followed by prompt improvement. In two of the illustrative cases the removal of a blind eye was the effective remedy.

However well understood and however general may be the knowledge of the relation of distant focal infection to ocular inflammations, most of the text-book writers neither properly accentuate this relation, nor bring before their readers many clinical facts which are of the utmost value for the proper appreciation of this important subject.

Those of us who have carefully watched the effect, for example, upon iritis of the removal of a distant focus of infection would, in discussing the etiology and prognosis of this inflammation, write somewhat as follows: All forms of iritis, save the traumatic, are of infectious origin. Excluding the tubercular, the venereal and certain rare forms, as, for instance, the leprous, the focus of infection will, in the vast majority of cases, be found in the mucous membrane of the upper air tract. This includes the sinuses, ear and dental region. The tonsillar crypts and the peridental structures furnish the seat of the focus of infection in most cases. Remove the focus of infection, and in acute iritis within twenty-four hours great lessening in the severity of the inflammation will be evident, and not infrequently, within two or three days all evidence of acute inflammation will have disappeared; and this without recourse to dionin, pilocarpin, sweating, subconjunctival injections, the iodides, sodium salicylate, or any of the usual world known, socalled remedies, used in cases of acute iritis. Atropin, of course, is excepted.

Thus would be presented our understanding of the nature and treatment of acute iritis. Nor would we stop there. Our conception of the nature of iridocyclitis, of uveitis, focal choroiditis, of certain changes of the retinal vessels would be identically the same. Those of us who wish visible evidence, in other inflamed tissues than those of the eyeball, of the effects of the removal of a distant infected focus have only to observe the well nigh marvelous changes which occur within forty-eight hours following the removal of infected tonsils in certain of the eczemas of childhood. The acute phases of the moist eczemas about the ears, for example, of little folks in most cases following tonsillectomy disappear within the same time, and the daily study of the visible changes in the skin, the seat of the eczema, furnishes valuable suggestions as to the condition of the iridic structure, from which the acuteness of the inflammation has so rapidly disappeared following the removal of a distant infected focus.

So far I have not seen in print any comments upon the peculiar appearances which the eye shows immediately after the acute arresting of an iritis; nor have I read any comments on the best after treatment. The sudden arresting of the acute stage is not as suddenly followed by a restoration to normal of the iridic structure, as one might think from the appearance of the eye, for the inflammatory products have still to be removed after the local inciting cause has been eliminated.

To the careful observer the important question arises: what is the nature of an inflammation from which every evidence of acuteness can be made to disappear within forty-eight hours by removal of distant infected focus? Is the inflammation of the iris, for example, the result of the presence of microorganisms or of their toxins in the iridic structure? If of microorganisms, how comes it about that they so quickly are deprived of inflammation making power, after the distant focus has been removed. Discussion

of these important questions is, however, beyond the scope of the paper.

Mrs. L., a frail woman, aged 55, had acute iritis of a severe type. Atropin failed to dilate the pupil. Internal remedies and external applications proved powerless to affect the severity of the pain or the visible redness of the circumcorneal structures. Her tonsils were very small, but both had infectious material in the uppermost crypts. They were removed. Within twenty-four hours all the pain and light shyness were gone. Within forty-eight, every trace of the redness of the ball had disappeared—and all without further treatment, save the use of atropin.

I take this case, which has lately been under my care, as the text for the comments to be found in this paper. Similar cases and similar results are familiar to all ophthalmologists. It may not, however, be uninteresting to comment upon certain phases of inflammatory infections of the eye, secondary to distant focal infection.

In the case of Mrs. L., just reported, the most striking feature is the rapid disappearance, without other treatment, of all acute inflammatory signs. It may be set down as a rule that this rapid improvement is always to be expected as soon as we have removed the focus of infection, and, conversely, where a suspected focus of infection has been removed and a rapid, marked lessening of the inflammation within twenty-four to forty-eight hours does not set in, we have not removed the true focus and should at once look for another in some other place.

Again, take the case of Mrs. P., aged 47, an inherited syphilitic, as shown by the sunken nose bridge, and Hutchinson teeth, and numerous other stigmata. She, for no apparent reason, developed an acute iritis, for which, in its earliest stages, she came to see me. In the years not so long gone by, it was my custom in similar cases to institute at once antisyphilitic treatment and atropin and await developments, and I often wondered why this treatment took so long to obtain results. Indeed, in a subconscious way, I used to wonder whether there were types of syphilitic iritis and iridocyclitis, which did not yield to syphilitic remedies. And from the failure of the specific remedies, I had good reason to wonder. What was done for Mrs. P? The use of atropin and extraction of a tooth about whose root was an abscess. In forty-eight hours the patient's eye was well.

Compare with this the case of Lizzie L., a mulatto woman of twenty-three. Her body had lately been covered with floreating secondary syphilides. Coinciding in point of time with these, there arose an iridocyclitis of a type which in the years gone by I had designated as malignant, so severe and painful were its manifestations, and so disastrous its effects upon the structure of the ball. Indeed, I can recall having seen as severe a type of iridocyclitis as this one only a very few times in my professional life.

When this patient came to me, she had been literally soaked with salvarsan and mercury in the effort to relieve the ocular inflammation which grew steadily worse. Examination of her throat revealed two large tonsils whose crypts were full of infectious material. These were removed. Within forty-eight hours the severe ocular pain had been relieved, and the patient's eyes straightway went on to recovery. Of course, the specific treatment was continued. Naturally in a system as charged with the microorganisms as was that of this case, and the true nature of the iridocyclitis having remained so long unrecognized, an immediate restoration to normal of eyes so severely inflamed could not be expected.

Again, Mr. L., aged 36, had had treatment for weeks for uveitis of the left eye, of a slow chronic type. Descemet's membrane showed numerous spots, large and small. The vitreous was so filled with opacities that he had to feel his way about. The right eye was blind. Before he came to see me, every tooth had been extracted with hopes that the ocular inflammation could be thus checked. Rheumatic and specific remedies had proved unavailing to make any visible change in the condition of the eye. Double ton-

sillectomy, likewise, was followed by no improvement. No other possible focus of infection along the air tract could be discovered. The right eye, I have said, was blind. Examination showed this eye to be apparently normal in size, to be free from discernible evidences of pericorneal injection. It showed a cataract which had resulted from a blow in the ciliary region. This blow had been received years previously, and after the eye had healed it had been the source of no discomfort other than that caused by the blindness. The tonometer showed that the tension of the ball was slightly minus. Enucleation of this blind eye was followed within two months by such disappearance of the spots in Descemet's membrane and of the opacities in the vitreous as to give the eye a vision of 16/16.

Or, take the slightly different case of Mr. P., aged 27. Right eye blind for many years as the result of a so-called "spontaneous" uveitis, against whose ravages the "usual remedies" had been of no avail. When I first saw Mr. P. the left eye was the seat of a general uveitis. The deposits in Descemet's membrane being so numerous that no details of the fundus were visible. The vitreous was filled with large and small opacities; there was no acute redness of the eyeball, nor was it painful. The condition had come on slowly and had lasted for many weeks, growing all the while worse. The vision was little better than light perception. Local and internal treatment had produced no appreciable effect. Attention to the teeth had likewise proved futile.

I found Mr. P.'s tonsils infected and removed them. Improvement in the condition of the eye immediately set in, and the disappearance of the deposits on Descemet's membrane was so marked that I thought, for the first three weeks following the operation, that I had solved the problem. The inflammatory condition, however, reached a point beyond which it refused to improve, and there was a slow recrudescence of the symptoms. Examination of the right eye showed that its tension was minus. It furthermore showed a slight undue tendency to congest under manipulation. It was enucleated. Following this the uveitis disappeared and gradually the eye cleared up as far as it was possible for it to do so; it turned out that many of the vitreous opacities were fibrinous. While the sight remained permanently impaired, Mr. P. was able to attend to his duties on his farm. The sequence in this case is interesting. In his teens, Mr. P. had an iridocyclitis in the right eye, caused by infection from his tonsils. Treatment had been futile and the sight of the affected eye had been lost. The iridocyclitis had resulted in partial disintegration of the ciliary body, with accompanying minus tension of the eyeball. When, years after the original inflammation had apparently stopped in the right eye, a general uveitis set up in the opposite eye, it at once became a question as to how far this inflammation was of the so-called sympathetic type and how far it was due to the still present infection in the tonsils. Reflection upon the history of the case makes it almost certain that each played a part in the production of the inflammatory picture present in the left eye.

Compare the case of Mr. P. with that of Mr. L. In the latter case, removal of all the teeth and both tonsils was followed by no discernible change in the condition of the eye under treatment, while removal of the blind eyeball had been followed by disappearance of the uveitis. In the case of Mr. P., immediate and very marked diminution of the inflammatory symptoms followed the removal of the tonsils, and yet after the inflammation had subsided to a certain degree, no further improvement had been possible until after the removal of the blind eye. The important suggestions which come from this case in regard to sympathetic ophthalmia and its treatment are evident.

We are often confronted with corneal and lid conditions which are seemingly slight and which, judging from past experience, we have reason to expect will readily heal under relatively simple local treatment. This we institute and to our disappointment proves to be ineffectual and we see our

simple, acute condition passing into a subacute or even chronic stage. What is the matter? Let me illustrate.

Mr. P. was struck in the left eye with a piece of pine bark. The rough bark combed, as it were, the nasal half of the cornea, producing numerous scratches of various depths, some of these penetrating into the substantia propria. When I first saw the case, the eye had been under local treatment for a month without any visible tendency of the scratches to heal. I carefully treated each abrasion with various well known remedies and without, at the end of ten or more days, any result. The patient asked if it would do any harm to have an old aching tooth removed, the left canine, if I recall aright. I said no. It was done and the corneal abrasions healed at once.

Or, again, Mr. B., aged 22, consulted me in regard to a smarting of the lower left lid which had been treated by his physician "until he was tired of going to him." Examination showed a subacute conjunctivitis confined to the outer part of the lid. This would yield to nothing I could suggest, until I had the infected tonsils removed, when the inflammation promptly disappeared without treatment.

In the summer of 1920, I was consulted by Mr. H., aged 53, in regard to his lids, which had given him trouble for the past fifteen or more years. The chronic conjunctivitis had resulted in bilateral fleshy ectropion of the lower lids, with its accompanying displacement of the openings of the lower canaliculi. I undertook to treat Mr. H. in face of the fact that I had never seen anything approaching a perfect cure in a similar case. Applying the usual text book suggestions as to treatment, I soon found I was not making any, save slight, progress; and it occurred to me that possibly the reason therefore lay in the fact that infectious material was being brought to the lids from a distant focus. Mr. H.'s diseased tonsils were removed. I saw him since I began this paper. There is absolutely no trace of the ectropion. "Doctor," said he, "in four months after I left you, you would not have known me."

When we leave the domain of the iris and ciliary body and enter that of the vitreous, what effect has the removal of a distant focus of infection upon its opacities? In proper cases we may expect results equally as rapid and as brilliant. For example, take Mrs. T., aged 50, over fat, with high pulse tension and big neck. On the occasion of her first visit, the fundus of the right eye showed hemorrhages and about the macula white spots, in short, one of the types of albuminuric retinitis. The details of the fundus of the left eye were not to be made out, owing to cloudiness of the vitreous; altogether the patient's sight was so bad that she had to be led to my office. Both tonsils were badly infected and were removed. Within twenty-four hours the patient commented upon the fact that her vision was improving. Within a month she had returned to her work, able with the left eye, from which all save remnants of the opacities had disappeared, to read newspaper type with ease.

It has not been very long since, with me, similar cases were put upon a restricted diet and the socalled "alteratives," and consigned to the care of doctors time and hope, and never once did these physicians work a quick or satisfactory cure. Before commenting upon the case of Mrs. T., it will be well to report that of Mrs. B., aged 65, a woman in apparently good health; pulse tension normal. The day prior to her visit to me, the vision of her left eye had very rapidly become obscured. On the occasion of my first examination there was no pink reflex from the fundus, the vitreous was so clouded that I could nowhere, by direct or indirect ophthalmoscopy, see the fundus; nor was I able to form any idea as to the nature of the lesion other than that it was of an exudative type. The right eye was normal. Both tonsils were infected. They were removed.

So little hope had I of any good result that I did not examine the eye until the eighth day after the operation, and only then because the patient commented upon the restoration of her vision. Examination showed com-

plete return of the pupillary reflex; the fundus being everywhere perfectly visible, and the only evidences of the former clouded state were a few small floating stringy threads anterior to the center in the vitreous. The vision had returned to normal.

The case of Mrs. B. throws light on the case of Mrs. T. The loss of vision in Mrs. T.'s left eye was not due to retinal lesions similar in degree to those visible in the right fundus, but to an outpouring of cloudy material into the vitreous similar to that present in the case of Mrs. B. In both cases the source of the vitreous clouding was probably a spot in the region of the ciliary processes. These two, for my experience, noteworthy cases and others similar in kind, tho less marked in degree, have entirely changed for me the prognosis in certain types of vitreous clouding.

Moreover, they serve to explain why the old methods of sweatings and salicylates and iodides and laxatives and tonics had to be continued so long and were all so seemingly futile. These methods, metaphorically speaking, were but efforts to keep dry, with mop and basin, a floor upon which water was dripping from a pipe overhead. The pipe continued to leak. So the infected focus continued to furnish to the source of the vitreous opacities its microorganisms or their toxins. These cases seem further to show me that the current thru the vitreous is a far more active stream than I ever inferred it to be from my studies.

A CASE OF GLIOMA OF THE OPTIC THALAMUS.

LOUIS A. LEVISON, M.D., AND F. W. ALTER, M.D.

TOLEDO, OHIO.

This case began insidiously and remained obscure to the end. The most light was thrown upon it by the ocular examination, showing evidences of optic neuritis and retinal thrombosis and, near the end, choked discs. The field of vision was narrowed in one eye but not so as to be characteristic. There was also proptosis and fixation of one eye. Autopsy showed the tumor, which proved on microscopic examination to be glioma.

F. L., 66, single; plumbing supply dealer; German; first seen Nov. 8, 1921.

Chief complaint is disturbance of vision in the right eye and pain in the right supraorbital region, extending up over the top of the head. Family history does not reveal anything of note excepting that the mother, still living, has a chorioretinitis, on account of which she has been practically blind for many years.

Previous History.—Alleged typhoid fever at the age of 36. Several attacks of rheumatism in early life, and a later one ten years ago. Sustained injuries to the knees nine years ago in a fall, which gave him some inconvenience at that time but did not leave any lasting effect. There is a history of a Neisser infection in early life, which was not entirely eradicated until he had prolonged and varied treatments at the hands of various men over a period of several years. Denies any luetic infection. The patient has been a heavy eater and his weight has gradually increased, as a result of this, from 170 to 200 during the past two or three years. The patient was formerly a brewer and during this period drank freely, but never to marked excess. Has not used tobacco for the past thirty years. Does not use alcohol at the present time.

The present trouble dates from about October 15, 1921. The first trouble was noticed on the part of the right eye, where his vision became impaired, associated with severe headaches centering in the frontal region, more particularly over the right supraorbital region. The pain was quite severe and interfered with his activities and sleep. There was no change, or relief in his symptoms, from any particular posture which he is able to assume. Dizziness was not a complaint, altho the patient could not change his position rapidly without becoming momentarily giddy. At this time there were no other symptoms complained of referable to the pul-

monary, cardiac, gastrointestinal, or urinary systems.

The examination, when first made, showed a short, heavy, stocky, individual; weight, 200 pounds; height, 66 1/2 in. The complexion was red. The skin showed finely dilated venules over the nose and along the attachment of the diaphragm. No abnormalities were noted with respect to the bones, joints or lymph glands. The position and gait were entirely normal. The patient could walk a straight line and go thru ordinary maneuvers without any evidence of becoming dizzy. The mental condition was good, aside from the anxiety and apprehension experienced by the patient from the realization of his serious condition. There was no delirium, apathy, or any other disturbance.

The skin showed no lesions. The mucous membranes of the throat and nose were normal. There was no edema of the legs. The head was well shaped, abundant white hair. The teeth showed evidences of apical infection and pyorrhea, on account of which he was referred to a dental surgeon and several teeth were extracted. The thyroid did not show any abnormality. The thorax was large, broad, thick, and symmetric on the two sides. The lungs showed normal findings in so far as could be determined. The heart examination revealed no visible apex impulse. There was no thrill. The areas of normal dullness were elicited with difficulty on account of the thick, fat chest wall, but there was no apparent increase in the size of the heart. Both heart tones were rather feeble and weak. However, all tones in the various cardiac areas were heard. The first sound at the apex was followed by a rather short systolic murmur, which could be heard over the mitral area and along the left edge of the sternum as high as the second interspace. It was not well transmitted to the left axilla and could not be heard at the angle of the left scapula. Rhythm of the heart entirely good. The blood pressure was 120/90. There was no apparent hardness of the accessible arteries. Temporal arteries not visible. There is no throbbing of the carotids, brachials, or temporal arteries. There is a possible slight difference in the volume of the radial pulse on the two sides, the right one being slightly weaker. There is a moderate dyspnea when the patient climbs stairs or undergoes any unusual exertion, but his breathing is free and easy during activities which he ordinarily carries out.

The abdomen is obese and somewhat pendulous. The liver and spleen cannot be palpated and are not increased in size. No tenderness or rigidity over the epigastrium, gall bladder region, or appendix was noted. There is a right sided inguinal hernia, on account of which the patient wears a truss. Genitalia negative. There is a very questionable pitting of both legs below the knees, but this is probably not a true edema. The joints are not swollen, tender or deformed. Examination of the nervous system showed patellar reflexes 4 plus, and equal on both sides. No ataxia. No Romberg. The finger-nose test normal. Gait normal. The movements of the extremities, head and other parts of the body entirely normal. The tongue showed no tremor, and was protruded in a median line and could be moved normally in all directions. There was no impairment of the palate or of the lingual muscles. The superficial and deep reflexes were entirely normal. All sensory tests normal. No tremor or choreiform movements.

Examination of the eyes (Dr. F. W. Alter), Nov. 1. 1921, showed the following findings:

The right eye presented the picture of a retinitis of the hemorrhagic type, with an accompanying obscuration of the optic disc. The vision in this eye was reduced to 20/200, no exophthalmos or ptosis present, motility of eyeball unimpaired, pupil sluggishly responsive and considerably larger than the fellow. Aside from his diminished central vision, he complained of the broken and uneven character of his vision in this eye, likening it to "scattered lumber" (metamorphopsia).

The left eye at his first examination showed 20/40, with lens correction, 20/20. Examination of the left field

revealed no abnormality, pupillary reaction normal. A careful examination of this eye at this stage did not reveal any pathology whatsoever.

Laboratory Examination.—The urine examinations showed normal findings, repeatedly. The specific gravity averaged 1020, the urine was clear, acid, and never revealed any albumin, sugar, blood, pus, or casts. The blood Wassermann was negative on repeated examination. A spinal fluid examination was made Dec. 1, 1921. Two or three c.c. were removed very cautiously on account of the possibility of serious results associated with lumbar puncture in cases of brain tumor. The fluid was clear, colorless, 3 cells per cu. mm., all of which were lymphocytes, negative globulin reaction, and negative Wassermann reaction with amounts up to 1 c.c.

Course of Illness.—The dull pain across the frontal part of the head and particularly over the right eye persisted and sometimes become very severe, especially at night. The patient was not dizzy. The vision in the right eye is practically absent and decreased on the left side. On Dec. 1, it was noted that the condition in the right eye changed suddenly over night to a *choked disc;* rapidly folowing on the heels of this condition there developed a typical thrombosis of the central vein, with its attendant multiple hemorrhages scattered thruout the whole fundus. The appearance of the left eye did not change. On this date there was a sudden proptosis of the right side, whereby the right eye protruded in a very marked manner. With this, there was considerable fixation of the bulb, so that the right eye could not be moved in any degree in any position. This proptosis was associated with severe pain in the eye, so that recourse was had to occasional hypodermic injections of morphin. There was at this time no localized sign of any kind, excepting with respect to the optic nerve.

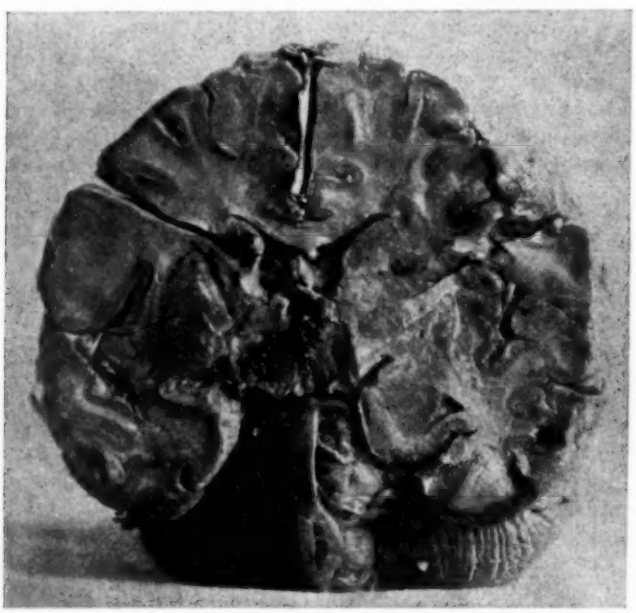


Fig. 1.—Glioma of optic thalamus, section showing tumor of right side.

The patient was kept in bed with applications over the eye. The conjunctiva of the right eye showed marked redness, swelling and edema. The patient became somewhat dizzy when he sat up or attempted to stand, but has been kept almost continuously on his back in bed. The left eye, during the first week in December, 1921, de-

veloped an *optic neuritis* with decrease in his vision. There is no impairment in the movements of the left eye, but the fixation of the right bulb still remains complete. On Dec. 9 the patient developed an incidental complication, consisting of swelling of both knees, especially the right, with probably serous effusion in both, and also some slight swelling of both ankles. This condition persisted about one week, but responded to codein and salicylates.

The X-ray examination of the skull on Nov. 22, 1921, showed symmetric findings. There were no gross lesions of the skull. The bones appeared to be equal in density thruout. There was a slight calcification of the pineal gland. There was no pitting of the inside of the bones as evidence of increased pressure. However, the courses or channels of the blood sinuses were very plainly marked on the inner surface of the skull. This was present to a very marked degree and is present thruout all the sinuses suggesting increased pressure on the side of the return venous circulation. The sella turcica was small and circular in outline. The clinoid processes were clearly defined. There was slight evidence of new bone formation with irregularity of the surfaces of the posterior clinoids. The mastoid, frontal and ethmoid cells appeared to be clear. A later picture taken Jan. 31, 1922, showed an evident decrease in the amount of pressure in the venous circulation as the blood channels were not nearly so well defined as in the previous plates. There were no other changes since the previous examination.

The examination of the eyes by Dr. Walter R. Parker, of Detroit, Feb. 23, 1922, resulted in the following opinion: "I am inclined to think that there is a venous thrombosis of the right central vein, with hemorrhage in the vitreous and fundus. There seems to be a remnant of the physiologic cup present. The fundus changes, together with his proptosis, are probably due to the marked venous congestion. The vision of the left eye, on this date, is 6/9. The fields show a marked contraction of the temporal regions, most marked above, with an enlargement of the blind spot horizontally from 5 to 25, extending vertically to the 150th meridian, and below to the 210th. There is a general absence of the pigment of the epithelial layers, leaving the choroidal vessels unusually distinct. The vessels are possibly slightly contracted and show distinct signs of paravasculitis."

During the months of January and February, 1922, the patient's condition

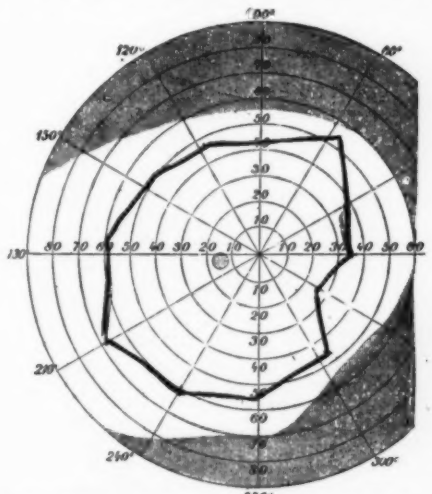


Fig. 2.—Contracted field of vision for the left eye as found February 17, 1922, in case of glioma of optic thalamus.

appeared to be stationary, with complete absence of vision in the right eye, but retaining enough in the left to enable him to walk about the streets and care for himself.

About April 1, 1922, the condition appeared to become progressive again. A punctate retinitis appeared in the left eye, becoming more marked until the end, but without any choked disc. There were no signs of thrombosis of the central vein of this eye. Along with this condition, the patient had been undergoing a marked mental change, whereby he is forgetful, careless of his personal appearance and actions. His general appearance and manner were decidedly slovenly. There was no evidence of any cranial nerve involvement excepting the eyes. The eye muscles of the left eye moved it in all directions. There was no ny-

stagmus. No paralysis of the tongue. No disturbance of the movements of the arms or legs. No ataxia. Sensory changes could never be determined.

The patient gradually lost ground, both with respect to his physical strength and mentality. He became dull and had to be spoken to several times, in order to have any request carried out. At this time he developed a very unusual appetite, and could not wait until his meals were served. He would stand at the dining table and eat food as it was brought in. A marked loss of muscular strength developed, so that sometimes he would sink down to the floor, when he attempted to walk or ascend one or two steps as in entering an automobile. The patient became very unsteady on his feet, rather from a loss of muscular strength than any particular dizziness. Patient became bedridden several weeks before his death, and was not able to help himself in any marked degree. About April 15, 1922, a well defined Babinski appeared on the left side.

Death occurred April 29, after a comatose period of two or three days.

The *autopsy* showed a tumor in the brain involving the thalamus region of the right side and impinging into the third ventricle, causing pressure on the opposite side. The mass was as large as a medium sized English walnut, and was dark purplish blue in color and rather spongy in consistency. It extended below the third ventricle, infiltrating the tissue, and was not circumscribed or encapsulated. From this apparent primary location it had extended anteriorly to the optic tracts, infiltrating the tracts, commissure, and optic nerves. The microscopic examination of the tissue, made by Professor A. S. Warthin, of the University of Michigan, showed the tumor to be "a variety of cellular glioma, very rich in atypical bloodvessels. The

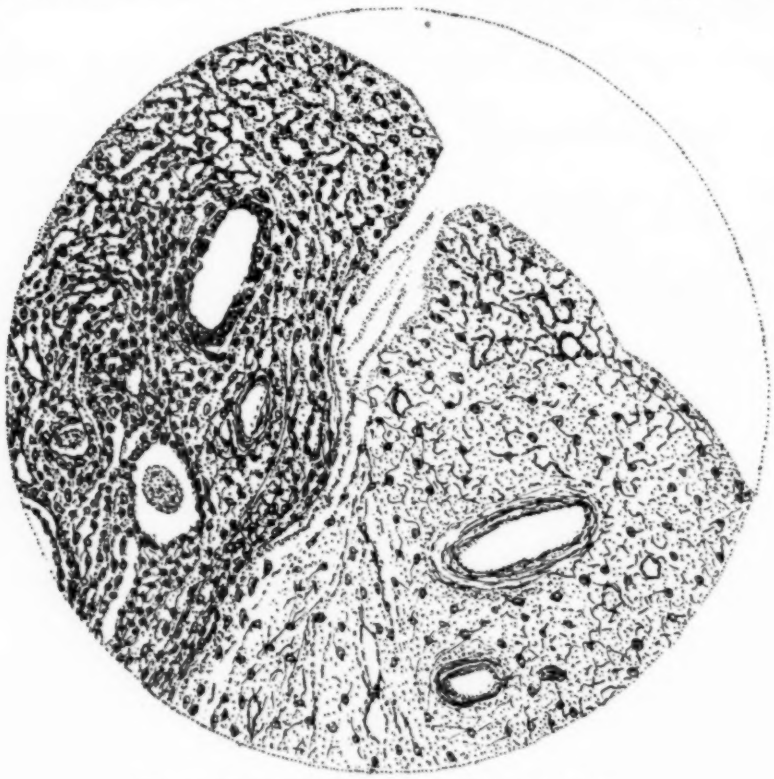


Fig. 3.—Glioma of optic thalamus, microscopic section.

specimen is almost a pure glioma with some rosettes, which some writers believe to be of ependymal origin."

COMMENT.—This case is of interest for the reason, that a lesion of the thalamus and subthalamic structures of the right side was present, and was followed to the termination of life without the development of sensory symptoms, choreiform movements or tremor. The individual was under very close observation and repeated examinations revealed no other findings than stated above. It is possible that enough nerve fibers remained intact in the midst of the tumor mass, to prevent the signs which are supposed to be characteristic of thalamic tumors.

PAPILLARY EPITHELIAL TUMOR OF ORBIT.

CLARENCE C. SAELHOF, M.D.

CHICAGO, ILL.

A tumor of the orbit removed from a child of eight was found to originate in the ciliary body. Apparently it was an instance of the very rare epithelial tumors primary within the eyeball. Microscopic examination showed no evidence of malignancy. The case is reported from the Department of Pathology and Laboratory of Physiological Chemistry, University of Illinois College of Medicine, Chicago.

Epithelial newgrowths in the eye have been reported by Meller[1] who records the origin of a tumor from the iris or ciliary body, showing cylindric cells containing much pigment. Fuchs[2] noted a tumor of the retinal epithelium which apparently arose from the ciliary body or iris, histologically resembling an embryonic retina. Martens,[3] Velhagen[4] and Neeper[5] likewise submit reports of primary epithelial tumors located in the globe. Because primary epithelial tumors of the orbit are very rare, the description of a new and interesting case seems warranted.

Fig. 1.—Epithelial tumor of orbit. Apparent origin from ciliary body.

CASE REPORT.

History.—Polish child, male, aged 8 years. At the age of 4 years the parents of the patient noticed a swelling about the orbit. An oculist was consulted and the diagnosis of staphyloma was made. Treatment was instituted and continued for approximately three years. Following this there was an interval in which the patient was not under medical observation. At the present time, the patient, in acute pain, was brought to the oculist for diagnosis. Examination revealed the terminal stages of an acute glaucoma and hemorrhage from the choroidal vessels. Immediate enucleation was advised and performed, followed by the insertion of a tube of radium containing 50.54 mg. of the element, into the orbital cavity for 12 hours. Preoperative diagnosis was tumor; probable glioma with suspicion of sarcoma.

Fig. 2.—Section showing epithelial portion of tumor arranged as gland like structure or solid rows of cells.

Pathology.—The pathology presented was as follows: Grossly, a recently enucleated eye; a very tense globe, with the anteroposterior diameter greatly increased. Thru error, measurements were not noted. Entire fixation of the globe in formalin for one week was allowed, at which time the eye was sectioned in the vertical plane into two equal halves to facilitate hardening. This cut revealed a large tumor mass posterior to the lens, suspended in the vitreous humor. Hemorrhagic extravasation was evident to the naked eye. Fixation continued for two more weeks, when sections were cut in the vertical plane of the entire globe and stained with hematoxylineosin.

The mounted section, to the unaided eye, reveals a vertical section of the eyeball with intense homogeneous red staining material. Due to the increased intraocular pressure, manifest landmarks are not present. A tumor mass, cauliflower in type, is seen filling the posterior chamber.

Microscopically, near the suspensory ligament of the lens, the origin of the tumor it is seen to arise apparently from the ciliary body. (Fig. 1.) The stroma of the tumor consists of pale

staining tissue. There are a few spindle and star shaped cells, many small and large round cells, and between these cells there is an intercellular substance which stains faintly blue with hemotoxylin. In other areas, the stroma is more compact and more cells are present. Between the cells, distinct fibers of connective tissue are evident. There are some sharply circumscribed areas where the stroma is formed almost entirely of small round cells, so that in these areas, formations similar to lymphatic tissue presents. In all parts, there are a large number of vessels, distended with blood. Smaller and larger accumulations of black pigment, probably melanin, are seen in various areas.

The epithelial portion of the tumor is composed of an apparent unit of cells, forming either gland like structure or solid rows of cells so that a meshwork results, differing in various areas, the meshes of which are filled by the mesenchymatous material described above. (Fig. 2.)

In the basal part, and in the central part of the tumor, the epithelial cells form a compact structure, while towards the periphery, the cells seem to change their arrangement to that of the glandular type. In the basal portion, the epithelial cells are relatively small and their nuclei are filled with dense chromatin. In the glandular part, the epithelial cells show more typical columnar shape, nuclei are small, oval and have a very distinct structure of the chromatin. These cells form mostly in single layer, but in some parts duplicate, and there is between the high columnar cells a second type of cell, shorter than the former and not reaching to the lumen, so that two rows of nuclei result. (Fig. 3.) No mitosis is evident. There is no distinct irregularity of the cells; all are arranged in rows in one direction.

Fig. 3.—Section showing arrangement of cells under higher power.

Diagnosis. — The tumor shows no microscopic evidence of malignancy. The epithelial cells, changing in their

arrangement and in their shape, cannot be compared with any normal cells of the retina. The whole appearance of the tumor is that of a slowly growing "benign" neoplasm. The lack of mitosis and of any tendency toward infiltration of the basement tissue tends to strengthen this conclusion. From the history, and the apparent embryonic nature of the stroma, this tumor probably originated in embryonic life and, therefore, belongs to that group of blastodermata which Albrecht[5] called Hamatoma.

BIBLIOGRAPHY.

Meller. Arch. f. O., 85, 11, 1913.
Fuchs. Ophth. Ges. in Wien, 1911.
Martens. Vereinigung niedersachischer Augenärzte, 1913.
Velhagen. Klin. M. f. Augenh., 1919, v. 62, p. 571.
Neeper. Ann. of Ophth., 1915, v. 24.
Albrecht. Deutsche path. Gesellschaft, 1904, v. 7, p. 153.

FAMILIAL RETINO-CEREBRAL DEGENERATION.

W. H. NARDIN, M.D. R. S. CUNNINGHAM, M.D.

ANDERSON, SOUTH CAROLINA. BALTIMORE, MARYLAND.

The literature regarding similar cases is here reviewed. Five cases occurring in one childship of nine children are here reported. The condition began at about seven years with impaired vision and pigmentation of the macula. Epilepsy was noted with progressive mental deterioration. Vision was retained longest in the periphery of the field. Optic atrophy, complete blindness and imbecility followed, terminating in death.

There have been described in the literature a group of interesting cases in which the most characteristic findings were progressive pigmentary degeneration of the retina at the macular region accompanied by disturbances of the central nervous system; the symptoms usually appearing at the period of second dentition. The first cases of this type were reported in 1903 by F. E. Batten[1], who studied two children in a childship of seven. Both cases were girls. In each there was impairment of vision beginning at six years of age; a few months later they developed epileptic seizures. Examination showed that they had pigmentary degeneration of the retina with central scotoma. Later their vision and mentality gradually deteriorated, and they eventually died in an asylum. Autopsy was not obtained in either case. The parents were not related.

In 1904 Mayou[15] reported three similar cases in a childship of seven. In this family the parents were first cousins. One boy and two girls were affected. All three showed defective vision at six years of age, and the retinal findings were not different from those of the other cases reported. One of these cases progressed to complete blindness; while in 1911 Oatman[18] reported that the other two were in schools for the mentally defective.

In 1906 Spielmeyer[23] reported four cases; there was a possibility of a luetic inheritance in these cases, the father having been infected after marriage. The children showed the usual retinal changes at about the sixth year and subsequent development of epileptic seizures and mental degeneration. Three died from pulmonary tuberculosis, while the fourth was alive at the time of the report. The microscopic findings from the examination of eyes and brain in these three cases have been reported by Stock[27].

In 1907 Oatman[17] presented two cases. These were studied very carefully and correspond very closely to those which we have to report in this communication. The elder of the children was a girl. She developed normally until seven years of age, when her vision and intellect began to fail. At nine years she developed epileptic fits, which have continued at irregular intervals. In 1911 (Oatman[18]) she had become quite imbecilic, but the degeneration of the retina had not progressed to absolute blindness, the peripheral fields being still sensitive to light and colors, as determined by the child being able to distinguish red

when shown a large red cloak. There was much less pigment in the retina and considerable evidence of still increasing atrophy. The second case, a boy two years younger than the girl, began having trouble with his vision at six years of age; at seven he began having epileptiform seizures. By the time he was ten years old, he was decidedly imbecilic. He had eccentric fixation of the eyes, large central scotoma, nystagmus, and in general presented a picture of optic atrophy.

Vogt[28] in 1907 reported several cases of somewhat similar type and among these, one corresponds so closely to those of Batten, etc., that it must be considered as belonging to the same group.

Three cases have been reported by Wandless[29] in 1909; these were entirely typical except that the original report did not describe them as having epileptic fits. The retinal and cerebral changes were, however, in every other way characteristic. The postmortem examination of one of these cases has been reported by Brooks.[9]

In 1910 Rogalski[20] reported one case in an otherwise normal family. The patient was a girl, healthy until her seventh year. At this time she became mentally defective and her eyesight began to fail. Ophthalmoscopic examination showed marked changes in the macular region. She became progressively worse, epileptic fits began at fourteen years and continued at frequent intervals until death. At twenty-three she was an absolute idiot of unclean habits, confined to bed, and totally blind. She died at twenty-six of a high grade marasmus. Autopsy was obtained in this case, and the microscopic findings were reported in detail.

Kuader,[14] 1910, reported four cases in a family of seven. These cases showed typical degeneration of the retina beginning at about six years, and three of them became imbeciles. The fourth was normal mentally at time of report, but showed characteristic retinal changes.

Gifford[12] reported in 1912 two cases in the same family. One a girl, normal until seven years of age; at that time mind and sight began to fail. She became subject to epileptic fits a short time before death, which occurred at fifteen years of age. She was an inmate of a hospital and had been blind and bedridden for some months before death. Subjective examination was impossible, but retinal examination revealed typical masses of pigment in the macular region and general optic atrophy. There was an older brother, whom Gifford did not see, who had had a similar condition beginning at seven years, and progressing to blindness and imbecility with epileptoid seizures and finally to death at twenty years of age.

Gifford (l.c. p. 585) states the following in regard to two cases reported by Firükowa:[11] "Firükowa reports a brother and sister, aged 9 and 6 1/2 years. Disease began at age of 6 years. The boy is markedly imbecilic, shows atrophy of nerves and marked atrophic changes in the retina, especially in the region of the macula. The symptoms are much less marked in the younger sister, who shows changes in the nerve and macula in the right eye only; vision reduced; left eye healthy." The original article has not been obtained, and it is difficult to determine whether or not the two Firükowa cases should be included with the remainder of those reviewed.

A case was reported by Schob[22] in 1912, of a girl normal until her sixth year, when vision and mentality began to fail. Ophthalmoscopic examination showed fine retinal pigmentation with some larger pigmented spots at the periphery, and atrophy of the nerve. She developed epileptic seizures at seven years of age, which recurred with increasing frequency. She was the only one of the family affected, but Gifford, in discussing this case, thinks this probably due to the fact that the mother died early in the child-bearing period, and all of her children died in early infancy with the exception of two, the case reported, and a sister, fifteen years of age, who was apparently normal.

Including the doubtful cases of Vogt and Firükowa, we have been able to find in the literature twenty-

five cases which correspond closely to those which we have to report. Stephenson[26], in discussing Mayou's cases, reported in 1904, stated that he had observed a case himself, similar to those of Mayou, and that one had also been observed by Gunn and Still, but we have been unable to find any report of these cases in the literature.

The five cases, all from the same family, which we have to report, conform with startling exactness to those already referred to, and the remarkable precision with which the symptom complex has been repeated in each of these cases makes a summary of the clinical findings a complete outline of the present state of our knowledge of this rare and interesting disease. Each child was entirely normal, as far as the parents have been able to tell and as evidenced by examination of the two youngest children in this childship, up to the age of six or seven years. About this time, each of them began to have some failure of vision, and in attempting to see they would hold the book or object close to the eyes and somewhat to one side.

Examination at this time revealed a considerable amount of brown pigment about the macular region, and a somewhat lighter color of the fundus especially about the nervehead. The changes in the retina have progressed in the two older children, until the retina presents a picture of complete optic atrophy with white nervehead. These two children apparently are completely blind, but the pupils, while they do not react to light, are normal in size and not dilated as in typical optic atrophy, so that it is entirely possible that there is very slight peripheral vision remaining. The objective symptoms, position of holding head to look at objects, etc., indicate the progressive development of central scotoma, but perimetry has been impossible on these cases, because of their rapid mental deterioration. During the period of from 7 years to about 10 or 11 years, the children have a very characteristic nystagmus which, however, disappears later.

About one and a half years after the first symptoms of visual failure become apparent, epileptic seizures intravene, and these are entirely typical of the classical *grand mal*. They are usually spaced, at first, at intervals of about one month, but later become more frequent and occur at an average rate of once a week. During this period, of from 8 to about 11 or 12 years, their mentality undergoes progressive deterioration until they reach a stage of imbecility, in which they are unable to feed themselves or to attend to their simplest wants. Physical examination reveals no other defects. Both cranial and peripheral nerves are quite normal, as far as the mental condition of these children will permit of accurate examination; and no evidence has been so far obtained of any retardation or anomalies in the course of the development of the endocrine system.

FAMILY HISTORY.

Mother and father well and strong. They give no history of neurologic disturbances, have average mentality, and their physical development is entirely normal. Father has internal squint; his vision in right eye 20/60; with —2, it is 20/40. Left eye normal. Fundus normal in both eyes. No history or evidence of venereal disease. No history of any defect in vision. Remote history reveals one cousin of the mother who had epileptic seizures as a child, but had a long latent period and then more seizures before dying at the age of forty. No history of any cases of blindness in family. The father had one "cross-eyed" sister, but she showed no mental defects and was not subject to epileptiform seizures.

CASE HISTORIES.

CHILD 1. L. G. Examined July 20th, 1920. Girl, aged seventeen. Oldest child in family. Birth was entirely normal. Was normal child as far as family could tell up to the age of seven years. Began showing some defects in vision about that time. At nine years she began having "fits," which, from the mother's description, were typical epileptic seizures. She became stiff, frothed at the mouth, bit her tongue, and fell, and finally slept for several hours. These spells have been very irregular but have continued to

the present time. She menstruated at fourteen years, has been very irregular. During the next six years following the development of the epileptic seizures, she became gradually incapable of seeing much; and finally either entirely blind, or practically so. During this time mental degeneration developed, parallel to the optic atrophy, until she became almost entirely helpless, had to be fed and had lost all knowledge of cleanliness. Condition at time of examination was that of a low grade idiot. She did not know anyone, but made a continuous mumbling noise and had some slight tendency to mild athetoid movements. The patient was very restless, stood up in bed several times and was generally difficult to manage. Examination of eyes revealed optic atrophy of advanced grade. Pupils did not react to light. Patient was very restless, and consequently detailed examination of eyegrounds was impossible.

Patient seen again August 2, 1922. Examination revealed a well developed girl for her age, 5 ft. 5 in. tall, but very anemic. The pubic hairs were normal and breasts well developed. Her mother said that she had never seen any evidences of masturbation; but the patient's habits were very bad—about like those of a few months old infant. Once during the examination she stood up when told to, but gave no evidence of any recognition or understanding. Patient entirely apathetic in manner, no mumbling but offered muscular resistance to any manipulation. Sat with head down, but was still and showed no athetoid movements. Retina was found to show complete optic atrophy. There was no evidence of any recognition of light when suddenly flashed into her face.

CHILD 2. Examined July 20th, 1920. M. G. A normal girl, of fifteen years. She was 5 feet 5 inches tall and weighed 120 pounds. Physical examination was entirely negative. She seemed normal, has had no epileptiform seizures. She works in a cotton mill, and her intelligence was that of the average girl of the uneducated classes. Examination of eyes revealed no especial defects. There was no history of disease. Menstruation began two years ago (at 13) and is normal.

Examined again August 2nd, 1922. 5 feet 7 inches tall; weight 130 pounds. Has had no trouble of any kind since last examination, still works in cotton mill. Retinal examination showed normal fundus; macula and nervehead showed no defects. She had no squint, but has not been refracted.

CHILD 3. Examined July 20th, 1920. A. G. Girl 13 years old. Physical development normal. Had intellect of child of two or three. Began having epileptiform seizures at age of 9 and has had them ever since. Vision began to fail at 7 years. Retinal examination revealed whitened nervehead, small arteries and a considerable amount of brown pigment distributed about the macula. Patient could see a little by looking sidewise and holding object close. She was very garrulous in a mumbling sort of way.

Note added August 2nd, 1922. This child died April, 1922, from pneumonia. Mother said that she became completely blind before death and was having many spells, so that she could not be kept in bed. No necropsy was obtained.

CHILD 4. Examined July 20th, 1920. M. G. Boy aged 12 years. Well developed boy for his age, physical examination revealed nothing abnormal. Began to show defects in his vision at 7 years and had his first epileptic seizure at 12 years. Examination showed that he could only see glimmerings of light, and he attempted to look at objects by holding them close and to the side, but was unable to recognize them. This way of looking at objects suggested large central scotoma. Fundus of eyes showed marked pigmentation in the macular region, white nerveheads, and very small vessels. Entire eyegrounds were a lighter color than normal. He had a nystagmus, rate of about 50. Ordinarily the eyes were turned upward and outwards (towards speaker or source of light). Had mentality of boy of three or four years, responded when spoken to, but had very little comprehension of question asked. Tried to talk but seemed only able to make a few silly remarks.

Boy examined again August 2nd, 1922. Physically well developed for his age. Weight 130 pounds. Pubic and axillary hairs normal, sexual organs those of boy of 16 years. There was no history of masturbation. While being examined he muttered either mother's or father's name continually, but obeyed when spoken to, provided it was done vigorously and about something specific, but gave very little evidence of attention. Father said that he pays no attention to habits, about like child of twelve months. Has to be fed most of the time, but will occasionally eat when food is handed to him. Seems to have a pleasant disposition and laughed when tickled. History of having frequent epileptic seizures; had three during previous week. His mother has noticed that after he has had several attacks that his mentality is much less active. He had an idiotic expression when seen. Examination of eyes revealed no reaction to light or accommodation on the part of the pupils, and no subjective reaction on the part of the subject. No nystagmus observed. Eyes rolled about just as in any blind person. Retinal examination revealed complete optic atrophy, white nerveheads, very small vessels, light eyegrounds with much brown pigment in the macular region of each eye.

CHILD 5. Examined July 20th, 1920. Macey G. Girl 9 years old. Nice looking healthy child. Could see objects fairly well by looking at them sidewise i. e. could recognize a knife, a pencil, or a book, but could not see much at a distance or very accurately. Eyes began to fail two years ago, and she had to be taken away from kindergarten. One year ago she began having epileptic seizures and has had them ever since. Seemed to be about as intelligent as a child of three years. Physical examination revealed no abnormalities. Examination of eyes revealed a squint of intermediate grade. Pupils reacted actively to light, but gave little or no reaction to accommodation. Ophthalmoscopic examination showed much pigment in the macular region, beginning whitening of the nervehead and some diminution in size of the bloodvessels. Slight nystagmus.

Seen August 2nd, 1922. Child sick in bed, pain in abdominal region, very restless and some fever. Examination of eyes was impossible. Mother said the child sees with increasing difficulty, and has had epileptic seizures during the two years since the last examination.

Seen again August 28th, 1922, after recovery from the acute febricula, the character of which was not determined. Examination: child eleven years old, well developed for her age. Could see enough to find her way about the house, but kept her head turned to left with the eyes directed upwards and towards left. She has not had an epileptic seizure since June 1922, and the course of the disease seems to have been somewhat slower than in the other cases. She seemed to have about the same grade mentality as when seen in 1920. Examination of eyes revealed a fine nystagmus, and the pupils reacted to light. The ophthalmoscope showed there was some pigmentation in the macular region, but not so much as in the other cases. The vessels were all small, and the nervehead light in color, but not entirely white.

The entire retina was light in color, tho, in general, both the nervehead and retina retained more color than those of the other cases at the same age.

CHILD 6. Examined July 20th, 1920. D. G. Boy, 6 1/2 years old. Bright boy, very active and playful, seemed entirely normal on superficial examination. Mother said he was entirely normal. Physical examination revealed no marked abnormalities. When he examined any object he held it very close to his eyes, about six inches from them. Examination of eyegrounds revealed a slight grayish cloud of pigment, especially prominent about the macular region but relatively diffuse in comparison with others of the family. Opinion that this case is in the earliest stage of the retinal degeneration.

On further examination, August 2nd, 1922, he seemed to have grown normally in physical development dur-

ing the two years, but mentally he has not advanced at all, shows a slight regression, but this was hard to determine. Physical examination did not reveal any defects. He has had two epileptic seizures, the first four months ago and one since that time. His mother began to notice defective vision about six months after first examination (July 20th, 1920); this failure in sight has been progressive since that time. He has never been to school. He is generally fretful and cross, but minds well. When he looked at an object he held it to the side, so that there was evidently some peripheral vision. Examination of eyes: nystagmus to right, rate about 70. Movement 3-4 mm. Pupils slightly dilated; they reacted to light. Nervehead white on examination of fundus, vessels small, but there was very little pigment to be seen, small amount in the macular region. Condition same for both eyes.

CHILD 7. Examined July 20th, 1920. L. G. Girl age 4. Entirely normal in every way except for moderate internal squint. Seen again August 2nd, 1922. Nice looking child, apparently entirely normal. Well developed in every way for her age, minds well, is not irritable. Internal strabismus of left eye. In the fundus, the vessels of left eye were smaller than those of right, and the coats appeared to be somewhat "thinner" than in the right, but otherwise the fundus of each eye appeared normal. No pigment could be detected in the macular region of either eye.

TWINS. Examined August 2nd, 1922. CHILD 8. D. L. G. Boy, 18 months old. Born first. Birth entirely normal and has not been sick at all. At present time he has twelve teeth and weighs 30 pounds. Walks well, and on physical examination showed no defects. Apparently entirely healthy. He had no squint. Pupils reacted to light and accommodation. Retina was hard to examine but color of eyeground good. No nystagmus.

CHILD 9. D. G. Girl 18 months old. Birth normal. Does not walk, has not been sick but has not grown so fast nor seemed so strong as D. L. G. Weight 20 pounds and has seven teeth. No squint. Pupils reacted normally. No nystagmus. Fundus of eyes were hard to examine but showed good color.

DISCUSSION.

There has been a great deal of discussion in the literature regarding the classification of these cases. They have been included in several different groups by different observers, in each case with quite definite and excellent reasons for such a classification. Stargardt[25] has reviewed the literature dealing with progressive degeneration of the retina and has reported finding twenty-three cases in which there was pigmentary degeneration of the retina, usually beginning about the macular region. In these cases symptoms appeared either about the fourteenth or fifteenth year, or later in life, and there was no appearance of cerebral complications.

Stargardt places these cases, together with those of Batten[1], Mayou[15], Batten and Mayou[4], Nettleship[16] and Oatman[17-18], all of which showed definite psychic disturbances, in one category, and denominates the group "familial progressive macula degeneration, with and without psychic disturbances." A similar study was made by Oatman[18] in 1911, but he thought the two types were less closely related than Stargardt, and attempted to classify the group of cases with nervous symptoms as a separate clinical entity, distinct from all the other similar conditions, and suggested calling this condition "maculo-cerebral degeneration." There has been much discussion regarding Oatman's justification in considering those cases in which the retinal degeneration began at the macula, as a different clinical entity from those cases in which the other symptoms were similar, but having a general retinal degeneration.

Gifford[12] calls attention to the fact that in some of these cases the retinal changes seem to have been first peripheral, and in others it has been impossible to state where the change began. In comparing the twenty-five cases given above, the outstanding features have been: the onset of retinal

degeneration at about seven years of age, the subsequent development of epileptic seizures, and finally, the mental deterioration to an imbecilic condition. It is entirely possible to suggest as Oatman has, that a portion of these cases in which the macular region was affected first, should be classified as a maculo-cerebral type, and our cases would unquestionably support this assumption, but we feel that the similarities in the entire group are so numerous, that these twenty-five cases, together with our five, should be considered as a clinical entity under the name proposed by Gifford[12] of "familial retino-cerebral degeneration." Oatman's classification seems entirely justifiable if one desires to subdivide these thirty cases, but the data in many of the reports is insufficient to determine the exact location of the retinal changes, and the pathologic examinations have revealed nothing which assists in this especial differentiation. Darier[10] has, like Stargardt[25], divided these cases into two groups, with and without mental degeneration. Blue[8] has reviewed twenty-six cases of the type of progressive degeneration of the retina without nervous symptoms. And Behr[6] has called attention to the hereditary factor in this type of the retinal disease.

Vogt[28], Spielmeyer[23], Rogalski[20], Gifford[12] and others have considered the cases of degeneration of the retina accompanied by nervous involvements as a form of amaurotic family idiocy. But, while considering these cases as belonging to this general type, they separate them into a subtype and so differentiate them from the original, classical type of Tay-Sachs. This subgroup they denominate a "juvenile form of amaurotic family idiocy." Gifford has given a very comprehensive review of this subject from the viewpoint just described.

In studying the cases which we have reported, and in following the discussions which have appeared in the literature, it has occurred to us that all of these cases may belong to one progressive type, with definitely decreasing malignancy in character, depending on the time of the onset of the symptoms. Beginning with the Tay-Sachs type of amaurotic family idiocy, which commences early, at two to three years of age, or in early infancy, and progresses very rapidly to a fatal termination, we have next in regard to the severity of progression, the retino-cerebral degeneration type, the symptoms appearing at the period of second dentition, to which type our cases belong; and finally, those cases which, beginning later in life, from the fourteenth year on, show only changes in the retina and do not progress to the stage of imbecility so characteristic of those cases in which the symptoms make their appearance earlier.

It seems entirely possible that the etiologic agent may be the same in these three groups, and the variability of the clinical syndrome the result of the differential resistance of the tissues at different ages. With this classification in mind, it is easy to consider the atypical cases, such as those of Vogt[28], Batten and Mayou[4], Hirschberg[13], Batten [2-3], Nettleship[16], Behr[6] and others, as fitting in between these more or less well marked divisions, which probably represent the ages at which there are some especial predisposing causes for a lowered resistance, e. g. second dentition, puberty, etc. The discussion of these atypical cases by Gifford[12] is by far the best that has appeared in the literature, and its comprehensiveness makes it unnecessary ,to go into the details of all the cases which do not correspond exactly to the three groups which we have outlined above.

The pathology of retino-cerebral degeneration has been studied largely from the viewpoint of differentiating this condition from the Tay-Sachs type of amaurotic family idiocy. The lesions found in cases of Tay-Sachs family idiocy are well known from numerous observations. The most characteristic findings in all these cases have been a widespread degeneration of the ganglion cells of both retina and central nervous system, and a white or greyish-white ring surrounding a red spot at the macula. Vogt,[28] Stock,[27] Behr,[5] Spielmeyer,[23] Rogalski,[20] and Brooks[9] (case of Wandless), have re-

ported pathologic findings in typical cases of the retino-cerebral type. Stock found the most obvious change to be a widespread destruction of the rods and cones, with very little change in the optic nerve. In the Tay-Sachs type the rods and cones usually were found intact, while the nerve was atrophied. The ganglion cells in the retino-cerebral type were partly degenerated, showing swollen nuclei and vacuolated cytoplasm. Many cells, however, showed no changes. Brooks, on the other hand, found that the retina and optic nerve were both entirely degenerated. All of these observers report finding considerable degeneration of the ganglion cells of the central nervous system, thus differing only in degree from the changes that are considered typical for the Tay-Sachs type. In some cases the ganglionic degeneration was only a cloudy swelling, while in others a pigmentary change was found.

Finally it seems worth while to consider briefly the relationship of our five cases to *retinitis pigmentosa*, and *central chorioretinitis*. In cases of retinitis pigmentosa, the degeneration of the retina begins at the periphery and progresses towards the macula. The patients as a rule have definite night blindness. As far as we have been able to ascertain, none of the cases which we have classified as retino-cerebral degeneration had definite night blindness; while several observers have reported their patients as seeing better in dim light; this was also true of our cases. Improved vision in dim light, together with the development of a central scotoma in these five cases, indicate very definitely that they cannot be classed as retinitis pigmentosa. Finally the cerebral manifestations are congenital in retinitis pigmentosa, but in these cases the children appeared entirely normal up to five or six years of age.

Central chorioretinitis almost always presents some inflammatory reaction, and the development of foci of pigmentary degeneration are resultant upon exudative phenomena. Etiologically, tuberculosis and syphilis seem to be the most prominent factors. In our cases there was no evidence of either of these conditions, and the developments of the pigmentary changes of the retina were entirely distinct from those reported in the cases of true central chorioretinitis; being especially characterized by their superficial, essentially retinal location, and by their circumscribed situation in the macular region.

Numerous theories have been suggested regarding the *etiology* of this condition; the one most generally supported has been the presence of some type of autotoxin which, under the stress of second dentition, attacks the retina, and thus initiates a progressive degeneration of the nervous tissues. This autointoxication theory has been supported by Stock,[27] Stargardt, [24 25] and Schlapp.[21] Blood relationship of parents, hereditary tendency, syphilis and the toxins developed from exanthemata have each been suggested, but none of them have been supported by sufficient evidence. Pusey[19], in studying a group of cases of retinal degeneration without disturbances of the central nervous system, suggests that they may be the result of a premature arteriosclerosis.

In our cases there has been no history of syphilis, and all examinations for this condition have proved consistently negative. No blood relationship between the parents exists, and none can be found to have existed in the marriages of the grandparents or great-grandparents. Only one member of the family, a maternal cousin, gave even a history of epilepsy, and this apparently without any evidence of eye defects.

Whether these various conditions can be ascribed etiologically to some inherited state of the germ plasm, which permits of less resistance to the normal strain of development, or to a premature senescence of certain tissues, or whether there is a definite toxic condition, it is impossible to state with any degree of certainty in the present state of our knowledge regarding this disease.

LITERATURE.

1. Batten, F. E. Trans. of Ophthalmol. Soc. of the United Kingdom, 1903, xxiii, 386.
2. Batten, F. E. Proc. Roy. Soc. of Med., 1916–17, x, Sect. Ophthalmol., 3–5.
3. Batten, F. E. Quart. Jour. of Med., 1913–14, vii, 444–452.
4. Batten, F. E. and Mayou, M. S. Proc. of the Roy. Soc. of Med., 1915, viii, Pt. iii, Sec. of Ophthalmol., 70–94.
5. Behr, H. Monatschr. f. Psych. u. Neurol., 1910, xxviii, 327–346.
6. Behr, C. Klin. Monatsbl. f. Augenheilk., 1920, lxv, 465–505.
7. Best, F. Zeitschr. f. Augenheilk., 1905, xiii, 199.
8. Blue, R. Jour. Amer. Med. Assoc., 1919, lxxiii, 1328–1331.
9. Brooks, H. Jour. of Nerv. and Mental Dis., 1910, xxxix, 251.
10. Darier, A. Ophthalmoscope, 1914, xii, 149–155, also Clin. Ophtal., Paris, 1914, xx, 3–13.
11. Firükowa. Abstr. in Zeitschr. f. Augenheilk., 1911, 498, cited from Gifford, 1912.
12. Gifford, H. Ophthalmic Record, 1912, xxi, 577–595.
13. Hirschberg. Zentralbl. f. prakt. Augenheilk., 1904, p. 12.
14. Kuffler. Beitr. z. Augenheilk., 1907, i, 14.
15. Mayou, M. S. Trans. of Ophthalmol. Soc. of the United Kingdom, 1904, xxiv, 142.
16. Nettleship. Trans. of Ophthalmol. Soc. of the United Kingdom, 1908, xxviii, 76.
17. Oatman, E. L. Arch. of Ophthalmol., 1907, xxxvi, 543.
18. Oatman, E. L. Amer. Jour. of Med. Sciences, 1911, cxlii, 221–235.
19. Pusey, B. Trans. Amer. Ophthalmol. Soc., 1915. xiv, 364–370.
20. Rogalski, T. Arch. f. Psych., 1910, xlvii, 1195–1211.
21. Schlapp. Cited by Oatman, 1911.
22. Schob, F. Fortschritte d. Med., 1912, Jahrg., xxx, 865–874.
23. Spielmeyer, W. Neurol. Centralbl., 1906, xxv, 51–55.
24. Stargardt, K. Arch. f. Ophthalmol., 1909, lxxi, 543.
25. Stargardt, K. Arch. f. Psychiat., 1917, lviii, 852-887.
26. Stephenson. Discussion of Mayou, Trans. of Ophthalmol. Soc. of the United Kingdom, 1904, xxiv.
27. Stock, W. Ber. d. Versamml. d. ophth. Gessellsch., 1906–07, Wiesb., 48–55, also Klin. Monatsbl. f. Augenheilk, 1909.
28. Vogt, H. Monatschr. f. Psychiat. u. Neurol., 1905, xviii, 161, 310.
29. Wandless, H. W. New York Med. Jour., 1909, lxxxix, 953–954.

NEUROEPITHELIOMA, OR GLIOMA OF RETINA.

JAMES A. MORGAN, M.D.

HONOLULU, T. I.

In this case enucleation was advised but at first refused. Later it was done and four other operations for successive recurrences. Death occurred with symptoms of brain involvement. Radium was used after the first recurrence, but proved ineffective.

H. K. Full blooded Hawaiian male. Age 3. An only child. Full term uncomplicated birth. Had none of the usual diseases of childhood except measles, which occurred during the course of the present illness. Father has always had excellent health. Mother died of influenza complicated by pneumonia, two years ago. Previously had had good health. One girl cousin has had tumors about the face and neck, which were apparently cured by several operations.

About the age of eighteen months, the father noticed a peculiar stare in the right eye, but thought nothing of it as the child did not seem to have any discomfort from it. No further attention was given to the condition until the child was past two, when the father discovered that the vision was very much diminished in this eye, and at the same time noticed the peculiar reflex, termed amaurotic cat's eye.

Ophthalmoscopic examination at this time revealed a whitish-yellow protuberance of the retina, externally and about two disc diameters from the disc. This area was well vascularized and somewhat granular or nodular on its surface. The rest of the fundus showed no further changes except for a general pallor. The vision was roughly fingers at six feet. There was no change in tension. There was no redness or pain in the eye, and the general health of the patient was good. At this time the father was advised as to the seriousness of the condition, and an enucleation advised. The father did not approve of an operation, and the patient was not seen for some time.

At the next visit, four months later, the child was fretful, restless and in considerable pain. At this time there was a decided increase in tension and no view of the fundus.

At the corneal margin, in the right external quadrant, there was a grayish-black protuberance rather nodular in appearance. There were no changes in the other eye.

An enucleation was performed at once but with considerable difficulty, owing to the friable condition of the globe. The latter was punctured in two places with the escape of a grayish gelatinous material. At this time, a pathologic diagnosis of glioma of the retina was made. The patient made an uneventful recovery, but by the end of six weeks commenced to complain of pain and insomnia. On investigation the orbit was found filled with a tumor mass, and a second operation was necessary. The tumor mass was made up of numerous grape like tumors or sacs, each one filled with the same grayish gelatinous substance as was found in the enucleated eye. These masses were adherent to the under surface of both eyelids and were dissected away only with considerable difficulty. The tumor masses extended posteriorly to the apex of the orbit and they were cleaned out as thoroly as possible.

Following the second operation, radium became available and it was applied. 100 mgm. in brass capsules protected by rubber tubing and a lead plate was applied. The first period was for seven hours, and there being no harmful reaction, the second application was for twenty-four hours. Following the second operation, there was no recurrence for a period of five months.

Fig. 1.—Glioma of retina one month before death. Front view.

Fig. 2.—Glioma of retina recurrence, side view.

The radium applications were given every four days without any harmful reaction.

At the third operation, the tumor mass removed from the orbit had assumed a different macroscopic appearance, in that, instead of the numerous cyst like tumors present at the previous operation, there was one tumor mass about the size of an apricot and no accessory tumors. There was no particular difficulty in removing this tumor owing to its firm consistency. There was no apparent recurrence for nearly five months, when the child again complained of pain in the orbit and insomnia. At the same time a tumor

appeared in the scalp of the right posterior parietal region.

At the fourth operation, the mass in the scalp was removed first and found to be in the fascia and not adherent to the skull. This mass consisted of the some cyst like tumors that were found in the second operation, while that removed from the orbit at this time was still firm and fibrous and with no accessory tumors. The radium applications were continued, and at the end of three months there appeared a mass in the right temporal region as well as a recurrence in the orbit.

At the fifth operation, the tumor in the temporal region was removed and found to have the same characteristics as that found in the scalp, and that removed from the orbit had resumed the same cyst like formation. The patient became so shocked at the last operation that no further surgical measures were attempted, but the actual cautery was applied from time to time to relieve the tension of the rapidly growing orbital tumor. The radium was discontinued at this time as the case was considered hopeless. Subsequently there was a rapid recurrence of the tumors. Around the site of the operation in the scalp a dozen large and small masses appeared, and the same occurred in the right temporal region, with the addition of several masses in the right side of the face extending downward into the neck and supraclavicular region. A few days before death, the little patient developed an unsteadiness of carriage and difficulty of deglutition, followed by hemiplegia of the right side.

Early in the course of the disease it was hoped that the use of radium was giving favorable results, in that the periods of recurrence were growing longer, and that the change of the macroscopic appearance was indicative of a change in type of tumor. But the latter was not confirmed by the microscopic findings.

Prof. Fuchs saw the case with me during this apparent favorable phase and he said, that altho he would be somewhat encouraged by the progress of the case, he would still look for an unfavorable outcome, even tho delayed. The material removed at the five operations was sectioned and examined by Dr. Larsen, pathologist for the Queen's Hospital, with the following report.

Each section showed many small spindle cells with many neuroglia fibrils in strands, scattered thruout the mass or at the border of the section. There was a fibrous tissue framework. Some of the tumors contain a large amount of infiltrated blood. There was no definite change in the type of the tumor in the different specimens, but the general character of the sections was the same thruout. Slight variations could be accounted for by the difference of location of the tumor, different methods of hardening, etc. There was no question that the tumor was a glioma of the neuroepithelioma type.

The cause of neuroepithelioma of the retina is unknown. It is a disease of early childhood, and no true case has occurred after the sixteenth year. Cases reported of a greater age were found to be sarcoma of the choroid or false neuroepithelioma. Of 467 cases gathered from the literature, 314 occurred during the first three years, 62 in the fourth and 299 in the fifth. The disease is congenital in 10% and possibly in the majority. Sex is without influence. In 25% both eyes are affected. The second eye becomes involved independently, there being no extension by the optic chiasm. The disease has been observed in several members of the same family.

The conditions most often mistaken for neuroepithelioma of the retina according to Wintersteiner are:

1. Simple detachment of the retina. This condition is comparatively rare in early childhood, and there is almost always a history of injury.
2. Leucosarcoma of the choroid. This is comparatively rare in early childhood.
3. Tubercles of the choroid. Here the history of the case is important altho the diagnosis may be difficult.
4. Chronic inflammatory processes of the choroid and ciliary body. These are the conditions most often causing error. They show retinal detachment and the presence of a fibrinous exudate which later becomes organized.

5. Acute suppurative hyalitis. The rapid course of the disease, the presence of hypopyon, scleral perforation, and the discharge of pus may clear the diagnosis.

6. Cysticercus in the vitreous, giving a bluish-white mass in the vitreous and unvascularized, is uncommon in this country.

7. Congenital abnormalities. Persistent vascularity of the lens capsule, and a hyaloid artery with posterior polar cataract may be mistaken for a neoplasm.

8. Retinitis circinata, when occurring in children, may be mistaken for this condition.

Neuroepithelioma of the retina is always a serious condition and without prompt treatment always causes death. Early operations are followed by 13% of recoveries. With perforation of the eyeball, especially posteriorly, death is certain, but operation will prolong life. It is said that if the disease does not recur in four years the patient is safe.

The treatment is early and radical. Any suspicious growth in the eye of a child calls for immediate enucleation and removal of the optic nerve as far back as possible. If microscopic examination reveals true neuroepithelioma, exenteration of the orbit should be performed.

NOTES, CASES, INSTRUMENTS

CHALAZION TECHNIC.

H. GIFFORD, M. D., F. A. C. S.

OMAHA, NEBR.

First, tell the patient that as such cysts sometimes go away of themselves, or with a little massage; he need be in no hurry about having it removed. This is the truth and he generally has it done anyway.

Get a good anesthesia. If you want to retain the affection of your chalazion patients don't operate after merely dropping in any local anesthetic. Inject 2% cocain all around it (not into it) and touch inner surface once or twice with 10% cocain. Then wait four minutes. Open freely thru conjunctival surface by incision at right angle to lid margin. Scrape out with sharp spoon. Then squeeze the tumor region between thumb and forefinger, with latter on conjunctival surface. Or if it be in the lower lid, squeeze between butt end of forceps on the inner side and finger on the outer side. Have patient hold his finger firmly pressed against outside of tumor region for a few minutes. Dismiss him with the injunction that as there are many meibomian glands, another tumor may show up apparently at the same spot; but that if it does so, you will remove it for nothing.

This squeezing performance has three distinct advantages. It evacuates the cyst better; one can almost always feel or see some chalazion stuff, that has escaped the spoon, come out. It stops the bleeding and thus avoids the formation of a hematoma which often makes the patient doubt, for some days, whether he has gotten rid of his tumor. Finally, one can not infrequently feel, while squeezing out the original cyst, that there is another much smaller one close to, but not opening into the first one; which it is well to empty even tho one may have to make several stabs before hitting its center.

While the squeezing method gives its most striking results in fairly large cysts, it is equally useful in the very small ones which form and often cause a persistent irritation at the edge of the lids. Also it often evacuates pus from neighboring glands and thus prevents apparent recurrences. If our cave dwelling ancestors bothered with such trifles as meibomian cysts, they probably employed some such method, but as I have seen no inscription or tablet to that effect, I make this report after testing it for twenty-five years.

STEEL SPLINTER PENETRATING LENS WITHOUT CATARACT FORMATION.

GEORGE H. CROSS, M.D.

CHESTER, PA.

Mr. T. A. U., age 32, white, foreman, while cutting salt glazed brick with a new steel chisel, was struck in the left

eye Oct. 10, 1922, by a thin sliver of steel 4/5 mm. long, which passed thru cornea, anterior chamber and iris into the lens, 2/3 mm. from the limbus at about 1 o'clock on the cornea. One end of this steel sliver was protruding from the wound when the patient was brought to the office one half hour after injury. The foreign body was removed immediately with forceps, atropin instilled and a roller bandage applied.

By ophthalmoscopic examination there was observed the small opacity of the lens, with posterior synechia at the site of the injury; and in addition there was noted in the center of the lens structure, at about 5 o'clock, a tuft-like, dense, white opacity, which was not in contact with either anterior or posterior lens capsule. In the absence of a history of previous injury and from careful examination, it was decided this was a congenital, lenticular defect, upon which the present injury had no influence. When discharged the vision was 20/20 in the injured eye.

In discussion of the case the question arose as to the influence, if any, of this congenital defect on the lens substance which prevented the formation of a traumatic cataract; or was the failure of cataract formation due to the needle-like character of the foreign body puncture, which sealed over quickly when the steel was withdrawn, preventing the access of aqueous in the lens stroma. This latter view seems the most likely explanation of this fortunate result.

SPONTANEOUS RUPTURE OF EYEBALL.

W. Whitehead Gilfillan, M.D., F.A.C.S.

NEW YORK CITY.

A. M. T., male, aged 75 years, had been confined to bed on account of an attack of myocarditis and arteriosclerosis. Without any warning except for a sharp pain for a moment, quite a large hemorrhage took place from the left eyeball as well as a considerable loss of vitreous and prolapse of the iris. This came out of the lower segment of the cornea, the rupture taking place there. Altho the patient was weak before the hemorrhage, he suffered some from shock after the rupture.

The patient had first come under my observation in January, 1904. At that time his vision was very poor, 20/200 in each eye, due to atrophy of both optic nerves. He told me his sight had been getting poorer for some years. Some years before he had been struck on the head by a ship's boom. The result of this was that he was blind for a time but his sight gradually returned. He likely had a hemorrhage into the vitreous.

When I saw him in July, 1906, his vision was nil, having only perception of light. No increase of tension.

The rupture took place on September 8, 1921. He died 12 days afterwards I was not able to get the eyeball for microscopic examination.

Spontaneous rupture of the eyeball is a very rare condition, less than 25 cases have been reported. I had a case in 1900 which I reported to the Eye Section of the New York Academy of Medicine, a report of which was published in the Medical News of January 25, 1902. This was the second case in this country to be reported. There had been one case reported in Germany. Many of these cases are due to chronic glaucoma. All the cases reported have been in aged persons over 65 years. All no doubt have had arteriosclerosis with high blood pressure.

Whether these 2 cases of mine were due to chronic glaucoma, or not, is hard to say. I am inclined to think that they were not.

ANTERIOR SUBLUXATION OF CRYSTALLINE LENS WITHOUT TRAUMA.

Maurice C. Loree, M.D.

AKRON, OHIO.

Case Report.—M. H., woman, born in Germany twenty-five years ago. Came to the United States at the age of fifteen. Married, three children living and well. No miscarriages. Did not have any of the usual children's diseases. Denies venereal diseases. Gives no history of any injury, accident or operation. Never sick until three years ago, when she had typhoid fever.

Has always been nearsighted. Her visual acuity for close work and reading was good until after the above illness; since then has gradually failed in both eyes so that she could see to do close work only with difficulty.

Present history commenced morning of June 5th, 1922. While bending over the wash tub rubbing clothes, patient suddenly felt something drop forward in left eye, blurring her vision so that she could not see to finish her work. The next morning came to the clinic complaining of blurred vision and slight pain thru left eyeball, radiating into temple.

Upon examination of the eye, found a glistening, crystalline, transparent mass, filling the anterior chamber. The pupil was partially dilated and the tension by finger palpation was increased. She could count fingers at six inches. Our diagnosis was a complete anterior dislocation of the crystalline lens with increased intraocular tension and progressive myopia.

The vision of the right eye was 10/300 without lenses and could be increased by the aid of a minus ten diopter lens to 20/300, using Snellen's test chart. Could read large newspaper type with difficulty. The pupil was small, iris tremulous, anterior chamber shallow and the tension slightly increased.

The patient was advised to have the dislocated crystalline lens removed thru a cataract incision, since it could not be reduced by pressure or finger manipulation. Because of personal reasons she refused to have operation that day, instead returned to her home, where a few hours later experienced severe pain thru left eyeball radiating into temple, with nausea and vomiting thruout the night.

She returned for operation morning of June 7th, with a well developed acute inflammatory glaucoma and slight clouding of the dislocated lens. The intraocular tension was increased in the left eye so that the crystalline lens was forcefully expelled with the aqueous immediately after the cataract incision was made. An iridectomy was also performed.

The prognosis before and after operation was guarded; the patient was informed of the possible conditions which might result in loss of vision, or of the eye. Fortunately the eye healed without further complications, and she returned to her home one week after operation, coming to the office every third day for a month for after treatment.

The vision gradually improved in the left eye. On Aug. 8th could read 20/100 with a $+12 \bigcirc +1.75$ c. ax. 105° correcting lens. The visual acuity was the same when examined Nov. 13th. At this time a plus two was added to the above correction and a second pair of glasses prescribed. She could read German print No. IV at 33 cm. with latter prescription.

Summarizing. This case is interesting and instructive because of the relative infrequency of a complete anterior subluxation of the crystalline lens, without history of trauma; the development of an acute glaucoma and cataract in the same eye within forty-eight hours after dislocation of the lens. Altho the progressive myopia, cataract and glaucoma were relieved by the operation, the patient required a cataract lens for distance and an additional correction for reading, and doing close work.

ABSTRACTS.

Elschnig, A. Cocain-Alcohol Injection of Sphenopalatine Ganglion. Klin. M. F. Augenh., 1922, v. 68, p. 295.

Elschnig tested the cocain-alcohol injections of the ganglion devised by Post, to obtain an effect like that following extirpation of the superior ganglion of the cervical sympathetic nerve in glaucoma. Nine cases are reported in detail. A final judgment on this method of elimination of the ganglion could not be attained. Post made the injections from the nose, while Elschnig thinks that the ganglion can be more safely reached by injection below the margin of the zygomatic arch. On account of the hypothetic role of the ganglion in the sympathetic supply of the eye, one cannot expect very much.

C. Z.

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly scientific papers and discussions, include date of the meeting and should be signed by the Reporter or Secretary. Complete papers should not be included in such reports; but should be promptly sent to the Editor, as read before the Society.

COLLEGE OF PHYSICIANS OF PHILADELPHIA.

Section on Ophthalmology.

December 21, 1922.

DR. MCCLUNEY RADCLIFFE, Chairman.

Xerosis of Conjunctiva Secondary to Trachoma.

DR. WM. ZENTMAYER presented E. H., Hebrew, aged 24 years, whose eyes became affected 12 years ago, while attending public school. No other member of the family was affected. Early a roller operation had been done, and as a result he had comparative comfort for 6 years. While in a military camp in 1918, the eyes flared up again and have been troublesome since. In November, 1921, tarsectomy of the left eye and canthoplasty of both eyes had been done in Chicago, after which radium was applied.

The patient came to Wills Hospital in the spring of 1922. The right eye was affected with a mixed type of trachoma with pannus, and the left eye a leucoma from a recent perforation of the cornea. In both eyes the lower palpebral conjunctiva showed a patch of epidermoid conjunctiva. Tarsectomy was now performed on the right eye. The patches of xerosis were so small that there was some doubt as to their nature. As Dr. Henry Pancoast was of the opinion that such a condition could not have been produced by radium, it was concluded that the case was one of xerosis, and the continued spreading of the keratonization with beginning involvement of the cornea confirms the diagnosis. The treatment employed, including the use of fibrolysin, has had no favorable results.

Discussion.—DR. S. LEWIS ZEIGLER said, that we should not overlook the fact that rapid dilatation of the tear duct might prove of value in the treatment of xerosis from trachoma, since lacrimal occlusion is a frequent sequel of trachomatous contraction, and the added drainage greatly improves the condition of the cornea and conjunctiva.

Wound of Cornea and Prolapse of Iris With Complete Recovery.

DR. WM. ZENTMAYER showed a patient, who had a piece of his own spectacle glass driven into his left eye. There was a valve like cut of the cornea near the limbus, into which the iris was prolapsed. The lower lid showed a lacerated wound. Less than 2 hours having elapsed since the accident, it was decided to attempt to replace the iris. This was accomplished with a spatula, a strong eserin solution was instilled into the eye, and a Van Lint conjunctival flap was made. Six days after the accident, the pupil was small, round and central, the conjunctival flap had slipped off the cornea, the wound was healed, and the lens uninjured.

Hyalin Degeneration of Cornea.

DR. WM. ZENTMAYER exhibited a female, 80 years of age, with cicatricial trachoma. The left eye exhibits a group of hyalin deposits in various stages over the lower part of the cornea. They vary in size from 1/2 to 2 mm., and in appearance from a large grain of sand to a porcelain bead.

Corneal Tuberculosis.

DR. WM. ZENTMAYER exhibited a negro, aged 22 years. Six weeks ago he had the sensation of a foreign body in the eye, accompanied by some redness, when he noticed the white spots on his eye. Is married, has 3 children, all healthy. Mother living and healthy. Father dead, cause unknown. No family history of tuberculosis, and never has been knowingly exposed to the disease. Pneumonia 3 years ago.

In the left eye the cornea presents about 30 grayish discreet circular opacities, from 1/2 to 1 1/2 mm. in diameter, fairly uniformly distributed and occupying the anterior layers of the substantia propria. There are fine

lines of haze connecting them. Their margins are soft, and there is no disturbance of the overlying epithelium other than a slight haze. The iris is uninvolved. There is no congestion except when the eye is handled. Wassermann was negative, von Pirquet positive.

The patient was placed in bed for temperature observation. There was an afternoon rise of 100-100.5 for several days. As it was taken that this indicated probably a tubercular lesion elsewhere, a physical examination was made which showed evidence of old fibrosis at the apex. This, however, was not confirmed by X-ray examination. Dr. Zentmayer thought there would have been danger to the patient had a subcutaneous tuberculin test been made, and believed that the diagnosis should rest with the physical examination.

Discussion. Dr. Luther C. Peter said the fact that the patient had been running a hectic temperature was no contraindication to the use of tuberculin. With considerable experience in the use of tuberculin in ophthalmic cases, he had never seen any serious consequences resulting from its use in patients suffering from a considerable rise in temperature. He referred to the case of a boy, six years of age, who suffered from phlyctenular keratitis, and who was given three months to live by an internist because of the pulmonary invasion. Improvement occurred after tuberculin was administered. The evening temperature, which rose as high as 103°, practically disappeared at the end of three weeks. He is now a young man of sixteen years, and is in apparently excellent health.

This case, and many others, has led Dr. Peter to believe that tuberculin may not only be administered in the presence of high temperature without any risk, but also, on the contrary, be administered with marked benefit to the patient. The temperature curve should be studied for a wek in order to obtain the patient's normal before tuberculin is administered. Great care, as a matter of course, should be observed.

Dr. F. Krause stated that he had used old tuberculin many years ago, and had learned that very minute doses should be given at first. He began in children with 1/50,000 mg. doubling the dose every second day until some reaction appeared.

A high dose sometimes produced a continued poor health, in others it appeared to do much good. He believes it to be a valuable remedy, but one to be used with great caution and respect.

Dr. Zentmayer, in closing, said a tuberculin diagnostic test is given first to determine whether the patient has a tuberculous lesion, and secondly whether the eye lesion is tuberculous, and the latter is decided by a local reaction. As it is evident that the same reaction may occur in a tuberculous lesion located, for instance, in the lungs, it would seem to him that in a case where we have clinical evidence of the existence of such a lesion, it would be bad judgment to employ the test. From what has been said, he is convinced that the internists are right in asserting that some ophthalmologists are reckless in the use of this valuable agent.

Wounds of Globe, Complicated by Tubercular Infection.

Dr. Edwin B. Miller exhibited S. S. H., carpenter, aged 30, with the following history: While chiseling a brick wall, the chisel was knocked out of his hand and struck his glasses over the left eye. A piece of the glass penetrated the globe, making an incision just over the line of the external rectus muscle, 3 mm. in on the cornea and 6 mm. back of the limbus. From this wound the iris and a bead of vitreous protruded. There were also two abrasions on the cornea, one 3 mm. in from the limbus at 5 o'clock and the other 4 mm. in from the limbus between 6 and 7 o'clock, about 3 mm. in diameter.

No particles of glass were found in the wound, and X-ray examination was negative. Under cocain anesthesia the prolapsed iris and vitreous were excised. An attempt to suture the sclera was followed by further prolapse of vitreous. The wound and entire

cornea were covered by a large conjunctival flap. At the end of six days the conjunctival flap had slipped back, the wound was nicely approximated and the anterior chamber was reformed. The wounds on the lower cornea, however, presented a grayish appearance with striae running from them. During a period of three weeks of local treatment, first with applications of tinctur of iodin, then trichloracetic acid, dionin, hot compresses, and finally applications of radiant heat, there was no change in the corneal lesions.

Careful inspection of the cornea led to the suspicion of tubercular infection, and, as a von Pirquet test was strongly positive, an injection of Koch's Old Tuberculin, 1/1000 mg. was administered. The dosage was gradually increased to 1 mg., and at the end of six weeks the lesions entirely healed and the eye was free from injection. With correction V. = 20/30. After thirteen months the patient returned, and with his lenses V. = 20/200. Examination, however, disclosed no disease, but the development of a high astigmatic error. Correction brought the vision to normal.

Daviel's Original Memoir on "Cataract Extraction."

Dr. S. Lewis Ziegeler said; in making a critical study of the data available for the preparation of a "History of the Operations for Cataract," he found that a review of the original documents showed that numerous incorrect quotations had been made by various authors, and that many wrong inferences had been drawn. From the standpoint of "human interest in historic verities" he believed that it might prove of advantage to submit to this section a literal translation of Daviel's original memoir on "A New Method for Curing Cataract by Extraction of the Lens;" which he presented and defended before the Royal Academy of Surgery of France, according to their custom, twice in one year, April 13 and November 16, 1752. This Memoir was published in the Transactions of the Academy, Paris, 1753, Volume II, page 337, and proved to record an epoch making discovery in the surgery of the eye.

Daviel was born in 1693 and died in 1762. He held the distinction of being appointed surgeon-oculist to the King. He not only originated flap extraction but, as will be noted in his own account, he was the first to devise a cystotome and to perform cystotomy. He was also the first to resort to cystectomy by removing with forceps a round flap of anterior capsule when the capsule was stiff and thick. He also added sphincterotomy when the pupil was rigid, and in cases of prolapse performed iridectomy.

De Wecker has attempted to disprove that Daviel made so large a corneal incision as 2/3 of the diameter, but Daviel himself states that his inferior incision was carried a little above the pupil, while his illustrations show this fact most clearly. Moreover, contemporary documents confirm the fact that his incision included 2/3 of the cornea, as is revealed in a "Report of Operations for Cataract by Extraction of the Lens" made before the Commission of the Academy on patients generously offered by M. Morand, Surgeon in Chief to the Hotel des Invalides, or Old Soldiers' Home, of Paris, which was published in the same volume. During this friendly competition, Morand couched several cases, while de la Faye and Poyet each made extractions with their respective cataract knives. Thurant, a pupil of Daviel, also confirmed the size of the incision in his thesis.

Daviel subsequently changed his views as to this extremely large incision, and reduced it to 1/2 of the diameter of the cornea. Up to 1756 he had performed 434 extractions with only 50 failures, an excellent record for a new operation performed under the conditions of that day. The number operated on by him during the last six years of his life has not been publicly recorded.

At the November (1752) session of the Academy, de la Faye, who was a student, friend and colleague of Daviel, and who later became Vice President of the Academy, presented a memoir

entitled "In Order to Perfect the New Method of Operating for Cataract," in which he proposed a new cataract knife in the form of a long narrow bistoury, slightly curved on the flat, which he believed would simplify the technic and eliminate three of Daviel's instruments. He claimed that the operation could be performed with this knife in less than a minute and would not, therefore, fatigue the eye as much as Daviel's slower and more painstaking technic. He calls attention to the fact that his knife is different from that of Pallucci. He also devised a cystotome of the spring lance type, and further holds the distinction of being the first to designate the instrument used to open the capsule by the name of *cystotome*.

Pallucci (1751) was undoubtedly the first to devise a simple corneal knife, and to make the *corneal puncture* with his broad triangular knife. He challenged Daviel's claim to priority in extraction before the Academy of Sciences, and also criticized his method of using four instruments to incise the cornea when only one was necessary. Pallucci's claim of priority was refuted, however, by the proofs submitted by Daviel, based chiefly on a letter written by Vermale to Chicoyneau on November 25, 1750, describing a series of extractions that he had personally seen performed by Daviel.

At the same session (1752), M. Hoin gave a dissertation "On a New Type of Cataract Observed," which is one of the earliest descriptions of secondary capsular cataract. These documents are all of historic value, but our present interest centers in Daviel's thesis alone.

Discussion.—Dr. P. N. K. Schwenk said we cannot lay sufficient importance on the teachings of our pathfinders in ophthalmology. Daviel's method was the first step toward a corneal flap for cataract extraction. Daviel's line of incision was unique in that it was parallel to the plane of the iris and directly at the sclerocorneal junction. Beer's corneal incision was slightly in front of Daviel's, in cornea.

Many suggestions and modifications have since been made, each surgeon claiming some betterment peculiar to his idea. Our city has had noted surgeons from abroad recently, demonstrating a technic peculiar to their liking. This caused Dr. Schwenk to determine which of the many operations might be the safest, bringing about the desired visual result with the least amount of risk and traumatism.

For years, he tried to get a small conjunctival flap, as advised by Terrien, of France; but this was usually accompanied by a marked reaction, which he attributed to the conjunctival flap. The conjunctival flap interferes with making a clean iridectomy, as the flap must be turned on the cornea to withdraw the iris to make the iridectomy. The iris should be cut with the scissors in the vertical meridian. Therefore, Dr. Schwenk adopted an incision of the cornea after Beer upward—Beer made his downward—in a plane of iris and just as the limubs, but within the cornea, avoiding to get to the root of iris or a conjunctival flap. If a smooth incision of the cornea is made parallel to plane of iris, there is no raw surface exposed, the wound coaptates and you get union by first intention, with much less reaction than you have when a conjunctival flap is used. This condition was also observed by an exresident at Wills Hospital.

Dr. Ziegler, closing: In reply to Dr. Zentmayer's query as to who first performed iridectomy in cataract extraction, he stated that Daviel was the earliest, altho he did this only in emergency cases where the iris had prolapsed. Desmarres (1850) occasionally excised the iris, while von Graefe (1858) performed it in certain cases of soft cataract, but Schuft-Waldau (1860) proposed it as a routine procedure, which technic von Graefe (1865) adopted in his modified linear extraction, and thus popularized it.

Referring to Dr. Schwenk's preference for Beer's method of extraction, it might be interesting to note that Wolfe (1864) of Aberdeen and later Glasgow, was the first to perform our modern method of cataract extraction, thus antedating both De Wecker

(1869) and Panas (1875), to whom this credit has usually been given.

Rapid Change in Refraction Probably Due to Altered Index of Vitreous.

Dr. H. Maxwell Langdon gave the history of Mr. G. E. B., aged 50, first seen in June 1917, for the correction of his error of refraction, which was:

R. —0.75 S. ⌒ —0.75 cy. ax. 150° =6/5.

L. — 1.00 S. ⌒ —0.75 cy. ax. 150° =6/5; an addition of +2.25 S., gave a suitable near point.

On October 22, 1920, he returned on account of blurred vision of L. for the preceding three weeks, attributed to the effect of some "drops" which he had used on account of a conjunctivitis. Examination showed no changes in any of the ocular structures, vision with the old corrections being R. 5/5; L. 5/20, but with —1.00 cy. ax. 150°= 5/5. The following changes of refraction were noted on the dates given, R. at no time changing in refraction:

Oct. 22. —1.00 cy. ax. 150°=5/5.

Oct. 26. —0.25 S.⌒+0.75 cy. ax. 45° =5/5

Oct. 29. +0.75 S.⌒+1.50 cy. ax. 90° =5/5

Nov. 1. +1.25 S.⌒+1.25 cy. ax. 120°=5/5

Nov. 4. +1.25 S.⌒+1.50 cy. ax. 105°=5/5;

on this date for the first time there was noted some floating dots in the anterior portion of the vitreous.

Nov. 9. +0.75 S.⌒+1.50 cy. ax. 90°=5/5

Nov. 23. +0.50 S.⌒+1.75 cy. ax. 60°=5/5

Dec. 7. +0.50 S.⌒+0.75 cy. ax. 90°=5/5

Apr. 15, 1921. —0.50 cy. ax. 135° =5/5; vitreous clearer.

June 21, 1921. Six weeks before this there had been great pain in the left brow, followed by a profuse flow of fluid into the nose. L. —0.75 S.⌒—0.75 cy. ax. 135°=5/5, since which time the refraction is unchanged. Still some slight haze into vitreous.

When first seen he was referred to his physician, who found he had bad teeth, with an inflammation of the gingival tissues of the left upper jaw, Wassermann negative, slight evidence of aortic aneurysm, blood pressure 140-95, slight trace of albumin, sinuses said to be negative. The jaw was curetted on Jan. 23, 1921, which was followed by decided improvement in the vitreous haze, and until the nasal developments it seemed that this was the cause of the refraction changes. At no time did any method of examination, including the ophthalmometer, show any corneal changes, nor did the lens show any signs of involvement.

It seems most probable that the changes were due to altered density of the vitreous, altering its power of refraction. It is positive that there were no changes in the cornea. The lens might have altered its refraction either by curvature or index. Flattening of the lens, causing the change from a myopia to a hyperopia seems rather improbable; and it seems unlikely that the index of refraction would change without some alteration in appearance, which did not occur. Pressure on the eyeball might shorten the anteroposterior diameter and produce this change, but under such conditions it seems probable that at least a moderate exophthalmos would ensue, but there was no alteration in the position of the globe. Reasoning by exclusion, the alteration of the density and index of the vitreous seems most probable.

Discussion.—Dr. Wm. Zentmayer said, that inasmuch as Dr. Langdon's explanation was, and any explanation must be, suppositional, he should like to suggest a possible explanation. It is difficult to understand how a change in the index of refraction of the vitreous could produce such a marked change in the astigmatism with normal vision. If there had been simply a change in the ametropia and the astigmatism had remained constant in amount, such an explanation as given by Dr. Langdon would seem satisfactory. Could it not be that the toxic agent present affected the ciliary body and produced meridional contracture with the resulting increase in astigmatism?

Dr. Langdon in closing said, conditions irritating enough to produce irregular contraction of the ciliary

muscle would have shown some signs of at least irritation of that structure even if not inflammation. The eye at all times remained perfectly white. There was very slight haze in the vitreous, as shown by the visual acuity on the different examinations, and he believed that an irregularity of its density could have occurred producing this irregular astigmatic change. Of course, as Dr. Zentmayer says, the whole case is in the realm of conjecture, but it seemed unusual and interesting enough to place on record, even if no definite solution of the problem could be offered.

Unilateral Papillitis Apparently Due to Infected Tonsils.

Dr. H. Maxwell Langdon exhibited Miss E. B. V., aged 17, first seen October 27, 1922, with a history that for the preceding two weeks vision of the right eye had been blurred; there had been no pain, no headache and no previous ocular trouble; the left eye seemed unaffected.

Examination showed V. R. 5/35; L. 5/5. R. had a central relative scotoma for colors and very slight blurring of the white at central fixation, pupils were equal and normal, ocular rotations well and equally performed, media clear, right disc hyperemic with some blurring of the temporal margins with no other fundus changes, the left fundus being normal in all respects. It was suspected that there was a sphenoidal infection. A rhinologic examination by Dr. Robert Hunter proved to be negative from a clinical and radiologic standpoint, Wassermann negative, urine and blood both in satisfactory condition, no other physical changes except for badly infected tonsils, which were removed by Dr. Hunter on October 29, 1922. Two days later there was a decided improvement in the vision, which by November 4, 1922, a week after the first visit, had improved to 5/15. On November 7, 1922, vision was 5/15 plus, but the temporal portion of the disc was decidedly more swollen, margins more blurred and a wheel had appeared at the right macula almost perfectly formed. One week later vision had improved to 5/8 partly, central color vision being but slightly blurred. On November 26, 1922, one month after being first seen, vision was 5/5 plus, macula wheel partially absorbed, disc still slightly edemic and central color perception normal.

In view of the quite complete physical examination with negative findings, except for the tonsils, and the prompt improvement on the removal of the infected tonsils, it seems reasonable to suspect that they were the site of the original infection.

Aniridia With Congenital Cataract.

Dr. F. Krauss exhibited a patient. The man, now 22 years of age, had both lenses needled about 12 years ago. Both eyes are nystagmic. The right eye is divergent, with no vestige of the iris. Floating anteriorly in the fluid vitreous and attached above, is a large ribbon of what appears to be capsular remains. The left eye shows no iris, its place being taken by a circular rim of dense capsule with a 4 mm. hole in it, acting as a pupil. Both eyes show a blue-white disc, with an atrophic excavation. The right eye, however, is full of vitreous opacities and has light perception only, while the left eye has 5/200 corrected vision.

Unusual Macular Changes.

Dr. F. Krauss presented a case of macular changes consisting of a large greyish hole in the macula, surrounded by a whitish-grey halo; over which the macular branches of the retinal artery remained intact. These vessels showed a distinct bending as they passed from the halo to the greyish depression occupying the macula. The center of this depression appeared to be the yellow spot, toward which all the vessels converged.

The patient, a female, aged 35, has a negative family and personal history. The Wassermann and von Pirquet tests were negative, as were all tests of the teeth, tonsils, and sinuses. She has been under observation for 20 months, the affection beginning suddenly two years ago. For many months the yellowish-grey homogeneous mass, about three times the diameter of the disc, remained almost stationary, occupying the macular ring. The surface was smoky, allowing only corkscrew like

ribbons of the ruptured hyaloid membrane to be focused with about 5 diopter lens. The optic disc had a filled in appearance, but the edges were sharply defined.

The edges of the swelling became more sharply defined, the cloud over it gradually absorbed, allowing the retinal vessels to appear, followed by the atrophy and hole in the macula. The area between the disc and macula cleared more rapidly than the periphery. The atrophy appeared nearly two years after the onset of the disease. The treatment was vigorous and diverse, but ineffectual. There is a large central scotoma.

Recurrent Hemorrhage in the Vitreous.

Dr. McCluney Radcliffe and Dr. C. A. Young (by invitation) presented a negro, aged 30 years, who was admitted to the Wills Hospital October 25, 1922. Family history negative. Patient has a moderate scoliosis the result of early rickets.

Vision of left eye became suddenly blurred, 3 years ago, and was entirely lost 2 years later. In August, 1921, the sight of the right eye became suddenly impaired, but after several days returned to normal. Similar attacks occurred in December, 1921, March and August of 1922.

R. Numerous vitreous opacities. Disc of a golden hue, the margins clearly defined. Several yellowish-white areas of atrophy along the course of the retinal vessels, and a few areas of proliferating retinitis with an elevation of 4 to 6 diopters. O. S. Faint retinal reflex. Vitreous chamber is filled with an organized mass. Vision, August, 1922, O.D.=6/60; O.S.=L.P. December 14, 1922. Vision, O.D.=6/9; O.S. unchanged. A fresh hemorrhage on December 17, 1922, reduced the vision of right eye to 6/30.

Wassermann negative. von Pirquet was slightly positive. X-ray of accessory sinuses was negative. X-ray of teeth showed apical abscesses and pyorrhea. Five teeth were extracted. Blood pressure, systolic 170, diastolic 100. Coagulation time over five minutes.

Discussion.—Dr. Wm. Zentmayer said that it may be recalled that Eales believed that constipation was the cause of this disease. He later, however, became more speculative and attributed the condition to vasomotor disturbance the result of gastrointestinal toxemia. Personally, Dr. Zentmayer believes this to be one of the conditions that probably has an endocrine origin. This view he expressed in Boston some years ago, and it has since been accepted by Fridenberg, Wilmer, and others. Both Dr. Verhoeff and Professor Fuchs expressed to Dr. Zentmayer their belief that certainly not all these cases are tuberculous. All of Eales' patients were asthenic, having weak pulses, cold extremities, complained of lassitude, etc., and most of them had epistaxis.

Dr. F. Krauss recalled three cases of recurrent hemorrhages into the vitreous. The first case died within two years of miliary tuberculosis. The second is a young married woman who is exceedingly obese, suggesting a possible pituitary secretory trouble. This patient did not take kindly to secretory treatment, but cleared under high doses of potassium iodid. It may be of interest, however, to state that on one occasion there was a wide spread subcutaneous hemorrhage, in the shape of spots 1 cm. round, after which the vitreous opacity cleared with surprising rapidity. The third case is an overworked hospital superintendent, who had recurrent hemorrhages after severe mental excitement or depression. Rest was most effectual, but worry was quickly followed by a small hemorrhage. The blood pressure was low.

Dr. S. Lewis Ziegler said the etiologic factor of constipation should not be overlooked in cases of ciliary hemorrhage. In several cases which he had presented before this Section some years ago, this was the most important cause. In his first published paper, such a case was described, the constipation following dysentery contracted on an ocean voyage. Repeated hemorrhages caused disorganization of the vitreous in one eye and cataract in the other. After seven years in the Institution for the blind, her sight was recovered by a V shaped discission of the cataract, only to be lost again by a

new hemorrhage, caused by eating strawberries. The blood was promptly absorbed, however, and normal vision regained. This has been maintained for over thirty years, the patient serving as a head nurse in two important institutions.

He had also seen a similar case caused by eating peaches. He thought, therefore, that it was advisable in all such cases to correct the constipation and to interdict the eating of strawberries and peaches. For treatment he used positive galvanism to break up and absorb the clot, and small doses of thyroid extract (gr. ss-j, t.i.d.) to improve the metabolism, and increase the power of absorption.

CHAS. R. HEED,
Clerk.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

February 19, 1923.

President, DR. ROBERT VON DER HEYDT.

Papilloma of the Caruncle.

DR. CLARENCE LOEB reported the following case: Mr. A. G., aged 52, came February 1, 1923, with the following history: About 20 years ago, he suffered with tearing of the right eye, for which the upper canaliculus was slit, and the nasal duct probed. Ten years ago, he noticed a hardening on the upper lid. About one and a half years ago, a growth was removed from this eye. The patient, who is a very intelligent man, states that it was removed from the upper canaliculus, by one of the best oculists in St. Louis. It returned, however, about one month later. His present complaint is of a mass in the inner canthus of the right eye. There is no pain, but a constant tearing and some discharge. The lids stick together at night.

Examination showed a tumor mass in the right inner canthus, of about the size, shape and surface appearance of a red raspberry. The photograph and drawing give a fairly good representation of its appearance. There was some secretion and lacrimation. The mass seemed to be composed of two parts. The lower part, about one-quarter of the entire mass, is definitely attached to the lower lid margin. The remaining portion occupies the inner canthus and extends into, or springs from, the slit upper canaliculus. The

Fig. 1.—Papilloma of cornea (Loeb's Case).

size of the tumor has caused an ectropion of the inner part of the lower lid margin. A diagnosis of papilloma of the caruncle and margin of the lid was made, and operation was advised, to be followed by X-ray treatment.

February 5th, operation under cocain anesthesia. As much as possible of the tumor was excised with the scissors,

Fig. 2.—Drawing showing details of papilloma of cornea.

with comparatively little hemorrhage. It was definitely established that the main mass sprang from the caruncle and not from the lacrimal sac via the canaliculus. The treatment since then has consisted in simple cleansing and mercurochrome. On February 13th, a treatment with X-ray was given. Patient will receive additional treatments later, and will be presented

later for comparison with his present condition.

The macroscopic examination is as follows: Pathologic diagnosis, epidermal papilloma. Gross: Several small pieces of tissue measuring 1 x 1.2 x 0.3 cm. The surface is very finely papillary. It weighs about 49 milligrams.

Microscopically, the tissue sent for examination consists of a papillary growth. The stroma of the papillae is composed of a dense hyalinized tissue, containing numerous small thin walled blood vessels. The epithelium surrounding the stroma is composed of many layers of squamous epithelium which is well differentiated, but does not apparently invade the underlying stroma. There is no definite evidence of malignancy.

The Use of the Large Gullstrand Ophthalmoscope in Undergraduate Teaching.

DR. E. V. L. BROWN stated that in his opinion no eye department in the country had the material to properly teach undergraduate ophthalmology. For the past two years the Eye Department of the University of Illinois had made daily use of the large Gullstrand ophthalmoscope in its fundus teaching, and could recommend it most highly. Students doing routine eye laboratory work in an adjoining room were called into the dark room, one by one, and cases demonstrated. During a period of twenty minutes, one day last week, fifteen students each got a good look at a case of primary optic nerve atrophy and returned to their laboratory work with a loss of only three to five minutes each.

Experience had taught him to limit the use of the instrument largely to chronic cases, and for the undergraduate these should be the classical, clear cut, and uncomplicated ones, such as optic nerve atrophy, glaucomatous cupping of the disc, and disseminated choroiditis.

Discussion.—DR. HARRY S. GRADLE said that he had made a little improvement in the Gullstrand ophthalmoscope in the matter of fixation. A flexible arm is clamped to the upright of the instrument, and at the free end is a minute lamp, which merely glows but does not give sufficient light to cause pupillary contraction. The lamp may be moved in three directions. This is fixed upon by the unobserved eye of the patient, thus maintaining better fixation of the eye under observation.

DR. ROBERT VON DER HEYDT stated that the Gullstrand new simplified ophthalmoscope might be attached to the slit lamp. This added equipment was very much less expensive than the original instrument. By the use of an added ocular, two observers might see simultaneously. With the instrument, one could see the fundus magnified forty times, and if the pupil was dilated, might observe binocularly at a magnification of twenty times. Its use was invaluable in the study of the incipience of nervehead and mascular changes.

Clinical Use of Differential Pupilloscope.

DR. HARRY S. GRADLE stated that the differential pupilloscope devised by Hess some years ago, was for the purpose of refinement in the diagnosis of various pupillary conditions.

The instrument consisted in a small nitra lamp which was attached to a rheostat. Rays from the lamp passed thru a tube were reflected at right angles by a plane mirror. They then converged thru the ocular directly to the eye of the patient. Interposed between the light and eye of the patient were filters of fixed density, absorbing a known quantity of light. We might control the amount of light that went to the eye of the patient by changing these fixed filters. Below them were two smoked wedges, with the smoke increasing from the apex of the wedge to the base of the wedge. If the two bases were together, the absorption was so great that no light passed thru. At the apices there was no greater absorption than were the light passing thru plain glass. The wedge was controlled by a small thumb screw, and the amount of absorption read off on an illuminated scale. There were the usual adjustments for accurate fixation, elevation, and so on. The

method of using the instrument was described in detail.

Changes in the dioptric apparatus of the eye would not change the pupillary reaction in the slightest. There might be changes in the retina, the receptor apparatus, which would affect the pupillary reaction of the eye; but the changes would affect the motor discriminative acuity, that is, the pupillary reaction as one saw it, and the visual discriminative acuity, the observation power of the patient, equally. The same held true of lesions which might affect the nerve up to the point where the pupillary fibers branched off.

When we passed on toward the optic cortex, a lesion at this point would affect the visual discriminative acuity, but would not affect the motor discriminative acuity. The pupil would respond to minute changes that the patient was not able to observe. On the other hand, after the pupillary fibers had left the optic nerve tract, any lesion from here on would affect the motor discriminative acuity, but would not affect the visual discriminative acuity. Thus we had a rather fine differential diagnostic point as to the location of lesions, depending on whether the motor or visual acuity was affected. Equally, the consensual reaction determined the function of that portion of the eye where the dioptric apparatus was impermeable to useful rays. In marked cases they might determine absolute sensitivity to such a degree, that we might say whether or not a patient might be operated on.

In using the instrument it was advisable to have the patient in a dark room, and allow two or three minutes of dark adaptation to take place. The motor discriminative acuity was measured, using a filter of second, third or fourth degree of absorption, depending on the activity of the pupil. The visual discriminative acuity might be measured at the same time, by having a response from the patient. That was translated into terms of absorption, and the result was expressed in a single figure—a quotient—and that quotient bore the relation of 9 to 10. Any variation from that magnitude was pathologic. Owing to the personal equation, one must allow for a certain degree of variation, and one might allow six-tenths variation; in other words, a quotient 0.84 was not pathologic, nor was a quotient of 0.96.

Discussion.—Dr. Robert von der Heydt said that since the advent of the slit lamp we had a more refined method of diagnosis in Argyll Robertson pupil. Dr. Feingold, of New Orleans, first drew attention to this method, at the St. Louis meeting of the American Medical Association, in discussing Dr. Bedell's paper, namely, by throwing light on the iris and pupil with a slit lamp and turning the light on and off, we might discover very minute degrees of reaction just observable by the microscope.

Dr. Gradle, in closing said with this instrument one obtained a magnified view of the pupil of six to eight diameters, which was more than was usually obtained from a head loupe. The pupil was under good illumination and could be followed well. The illumination of the pupil was central and fell upon the six degree area around the fovea; whereas in examining the pupil with lateral illumination with the head loupe, it was difficult to bring the light sufficiently central to strike the foveal area. The minimum amount of light, only, was measured, which would cause any or complete contraction of the pupil. The entire pupil was under observation. In cases where there were extensive posterior adhesions, one might measure the pupillary reaction by a small amount of contractility of the pupil which might remain in one sector, and the result would be more accurate than by the crude methods at our disposal.

As to the value of this instrument from a diagnostic standpoint, it was a refinement in our armamentarium and gave us a method of measuring a minimum of light that produced pupillary reaction. That minimum amount of light sometimes was not dependent on any condition of the dioptric apparatus of the eye. From his own limited experience, and from the far greater experience of Hess and others who had worked with the instrument, he maintained that the Argyll Robertson pupil could be diagnosed far earlier by this instrument than could be done by the ordinary means at our command.

Brain Tumors with Specimens.

DR. EMANUEL B. FINK stated that the first specimen belonged to a case reported before the Society at its December meeting, held at the Cook County Hospital. It was a classical tumor of the anterior lobe of the hypophysis, with bitemporal hemianopsia, and a rather late appearance of beginning choked disc. At that time, he demonstrated this specimen before it had been hardened and sectioned, and it was seen that the optic chiasm was completely destroyed, with destruction of the floor of the third ventricle and infiltration of the tumor, extending anteriorly almost to the frontal lobe. After hardening, the specimen was sectioned, and now showed a very interesting infiltration anteriorly and posteriorly. Beginning in the floor of the third ventricle, in the first section below the optic chiasm, was to be seen infiltration of the tumor anteriorly almost to the floor of the lateral ventricle. The tumor mass consisted of a hemorrhagic, infiltrating carcinoma, not infiltrating the tissues themselves, but pushing the lining of the lateral ventricle ahead of it.

A very interesting thing was that the tumor mass did not involve any of the basal ganglia. The man's only complaint was disturbance of vision due to bitemporal hemianopsia and headache.

The second case was that of a young woman, 21 years of age, who entered the Cook County Hospital Service of Dr. Suker. She had been previously seen at the Postgraduate Hospital, where a diagnosis was made. She complained chiefly of blindness, attacks of dizziness, and peculiar headache. All the symptoms dated back six months. The headaches were of the occipital type, and radiated from the occiput toward the anterior portion of the head; otherwise she had no general complaints. This young woman had a goiter operation at the age of sixteen.

Physical examination showed a rather slenderly built white woman, apparently not acutely ill. The main points in the examination were ophthalmoscopic. Vision in the right eye was reduced to light perception only. With the left eye she could count fingers at a distance of eight inches. The pupils were widely dilated and completely rigid, not reacting to light or accommodation. Bilateral lenticular cataracts, probably congenital, were present. She was in the hospital only seven days, and died a few hours after spinal puncture. Examination of the spinal fluid was negative. There was a negative blood and spinal fluid Wassermann, and only about eight cells, all of them lymphocytes. In this connection he would emphasize the importance of care in making spinal puncture in conditions of increased intracranial pressure.

The specimen found at autopsy showed a distinct pouching of the floor of the third ventricle. At the time of the autopsy, it was considered a cyst of the infundibulum of the hypophysis, but after complete hardening and sectioning thru the center, it was seen to be a cyst in the floor of the fourth ventricle. The ventricle had become greatly dilated, communicating at this point with the third ventricle, also greatly dilated, and markedly enlarged and dilated lateral ventricles. A section of the portion of the wall of the cyst of the floor of the fourth ventricle showed that the lining consisted of marked hypertrophy of the ependyma of the wall of this ventricle.

In the third case, the patient entered the Cook County Hospital with a diagnosis of brain tumor, and complained of blindness in the right eye of about six months duration. She had headaches but no vomiting. An interesting point in the history was that she had intermittent rhinorrhea, with which her headaches were relieved for a time.

Examination showed right exophthalmos, complete external and internal ophthalmoplegia, and right optic atrophy. In addition she had an ulceration, old and healed, of the soft palate producing a complete destruction of the uvula, and a marked reduction in the size of the nasopharynx.

The day before she died, X-ray plates showed marked cloudiness of the right ethmoid cells. There was a positive

blood Wassermann, but negative spinal fluid Wassermann. On the basis of the old, healed, and active gummata in the pharynx, a diagnosis was made of basilar meningitis, probably syphilitic in origin, with the possibility of a gumma behind the eyeball, responsible for the exophthalmos.

At autopsy, it was found the exophthalmos had largely disappeared, lending support to the view that this might have been a syphilitic affair. An interesting finding was a complete destruction of the right optic nerve, by an acute suppurative process. This necrosis and suppuration involved the right optic nerve, the posterior and anterior clinoid processes of the hypophysis, and the hypophysis was completely destroyed as far as could be determined from the gross examination. Opening into the anterior ethmoid cells, more suppurative necrotic material was found, destroying the cells; and the ethmoid bone in the region of the cribriform plate was involved in the necrotic process over an area of two by three centimeters. There was no meningitis except a localized meningitis in the region of the optic nerve. The lesion was right in the chiasm and posterior to it, involving the hypophysis.

Discussion.—Dr. Lewis J. Pollock, by invitation, stated that he was particularly interested in the first two cases, because of the importance of recognition of lesions of the third ventricle in the production of signs referable to the optic nerves, the oculomotor nerves and the pituitary body. In 1909, Dr. Weisenburg collected 27 cases of tumor of the third ventricle. These tumors did not give rise to any definite symptomatology, but oculomotor disturbances were very common.

Hydrocephalus with cystic third ventricles frequently produced the clinical picture of a tumor of the third ventricle. He had the opportunity of examining such a brain postmortem. The patient had shown a bitemporal hemianopsia, and a marked dysfunction of the pituitary body with gross adiposity. When the pituitary body was compressed by a cystic third ventricle, the pineal body likewise suffered as the result of the same mechanism.

Dr. Clark W. Hawley said he sent the second case to the Cook County Hospital. He made a diagnosis of brain involvement of some kind, just what, he did not know. The description given by Dr. Fink of the condition of the eye was absolutely as he found it, and it was most difficult to make out the changes in the fundus because of the condition of the vitreous and lens. The pupil was widely dilated. She was the happiest patient he ever saw. She was smiling all the time and perfectly contented.

Dr. Fink, in closing, stated that microscopic examination of the first tumor, taken from the original specimen as removed from the region of the hypophysis and from the floor of the third ventricle, showed it to be a basophile cell type of pituitary tumor, described by Ewing as an adenocarcinoma of the pituitary.

The question of extensive infiltration of this tumor was of interest in connection with the pituitary syndrome. Here he had a very extensive infiltrating tumor arising from the anterior lobe of the hypophysis and producing the socalled hypophysis syndrome. Whether in such a case as this the adiposity, increased sugar tolerance, and polyuria should be ascribed to disturbances of the pituitary body rather than to some disturbance of the third ventricle, or the other region of the infiltrated tumor, was a question open for discussion, and one on which a good deal of work was being done at the present time.

As to the pathology in the second case, this condition was entirely congenital, due to obstruction of either the foramen of Magendie or the foramina of Key and Retzius.

The third specimen was of great interest from a clinical standpoint as demonstrating the possibility of unilateral involvement following sinus infection, but this was a rare complication. In connection with this tumor there was also septic thrombosis of the cavernous sinus on the right side.

Clarence Loeb,
Corresponding Secretary.

PITTSBURGH OPHTHALMOLOGICAL SOCIETY.

January 8th, 1923.

Dr. Edward A. Weiser, presiding.

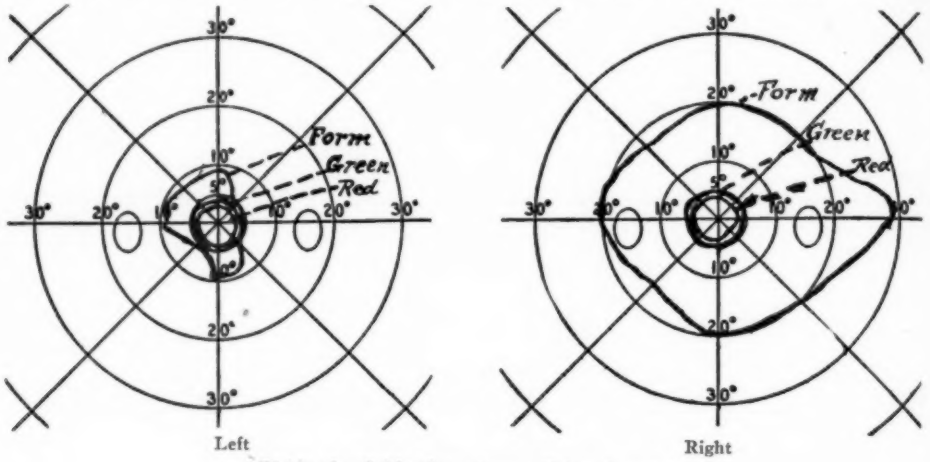
Neuroparalytic Keratitis; Enucleation without Anesthesia.

Dr. Edward Stieren reported the case of A. B., male, aged 46, who presented himself Dec. 29, 1922, with a letter from Dr. Harvey Cushing which stated that, as a result of an operation for the removal of an acoustic tumor, the seventh nerve was inevitably destroyed and the root of the trigeminus was severed, leaving on the right side a combination of facial paralysis and total fifth nerve anesthesia.

Altho the patient stated that he had had no trouble or discomfort with the right eye for a period of ten months following his brain operation, the right cornea was found to be at least one third smaller than the left and was generally hazy, with yellow deposits in its stroma. There was a small hypopyon present.

The conjunctiva was moderately injected, and the lower lid had the typical sagging of a seventh nerve paralysis, with moderate epiphora. The eye and the right side of the face were totally anesthetic.

Enucleation was advised and cheerfully accepted. It was performed without any anesthetic at the Columbia Hospital, Jan. 3rd, 1923. Several interesting observations were made during the operation. First, there was absolutely no sensation to the patient, who followed the various steps of the operation with great interest. Secondly, the conjunctiva bled much more profusely than is usual, and rather firm adhesions were present in an area halfway back to the equator, indicating that a low grade inflammatory process of the anterior segment of the eye had been going on for some time. Thirdly, the patient when asked to describe the sensation when the optic nerve was divided, declared that the only sensation he felt was hearing the snip of the enucleation scissors; there was absolutely no sensation of light, altho the eye was capable of distinguishing a moving hand at one foot.



Fields of retinitis pigmentosa. (Stieren's case.)

Postoperative hemorrhage was more profuse than is usual, due, no doubt to vasomotor paralysis; it was readily checked with hot compresses. If a glass eye cannot be worn satisfactorily on account of the sagging of the lower lid, an external tarsorrhaphy will be performed.

Retinitis Pigmentosa.

Dr. Edward Stieren exhibited the case of H. G. F., male, aged, 37, who has been under observation since Feb. 24th, 1922. At the first visit, vision in the right eye was 6/20—, which was improved to 6/15— with lens plus 0.50 cyl. axis 180°; in the left eye, vision was 6/20—, which was improved to 6/15 with lens plus 0.50 cyl. axis 180°.

Pupils were normal in size and reaction. Tension was normal in each eye.

The accompanying fields were taken at that time and have not changed materially to date. Patient has been taking constantly: Strych. Sulph. gr. 1/20 and Ac. Phosphoric dil. m. xx three times daily. Vision in the left eye, with correction, has improved to 6/12. There has been no change in the vision in the right eye but binocular vision is 6/8.

The fundus shows the typical narrowing of the retinal vessels. While the "bone corpuscle" pigmentation is not so marked, occurring only occasionally, there is a general pigmentation of the retina, especially in the periphery.

GEORGE H. SHUMAN, M.D.,
Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY.

January 20, 1923.

DR. F. L. BECK presiding.

Resolutions as to Pensions to the Blind.

It being apparent that in a number of cases pensions under the state law for pensions to the blind had been awarded without sufficient investigation and to persons who were not entitled to such pensions, the society resolved to undertake without charge, thru its individual members, the necessary examinations of the eyes and vision of applicants for pensions under the law.

Iridocyclitis after Cataract Operation.

C. A. RINGLE, Greeley, presented a woman, aged sixty years, who had had a severe iridocyclitis after needling of a dense secondary cataract in the right eye. Cataract extraction had been done in June, 1920, and the needling in July, 1922. Between the first and second operations there had been some attacks of inflammation in the left eye, with adhesion of the iris to the lens capsule. Since the needling there had been very little improvement in vision, altho the eye had finally become quiet. The left eye had a slightly cataractous lens, but the vision was almost normal.

Discussion.—E. R. Neeper, Colorado Springs, referred to a case in which an inflamed eye had quieted down after removal of some hidden roots of teeth, which were supposed to have been extracted long before.

EDWARD JACKSON, Denver, thought that the attack of iritis in the other eye at a time when there was no trouble in the eye that had been operated upon clearly suggested that some constitutional condition was at fault.

W. C. BANE, Denver, referred to a case in which needling had been followed by a good deal of irritation, apparently due to traction upon the ciliary body during operation.

W. H. CRISP, Denver, remarked that there was perhaps no operation in which absolute sharpness of the knife was so essential as in needling for secondary cataract.

Injury by Dynamite Cap.

F. R. SPENCER and C. L. LA RUE, Boulder, presented a man, aged twenty-seven years, who had been first seen in 1911 on account of an injury of the left eye from a piece of a giant dynamite cap. At that time there was a penetrating wound thru the left lower lid, the cornea and lens were hazy, and there was blood in the lower part of the vitreous. The patient had at once returned home for treatment by his local physician. He had come again to Drs. Spencer and La Rue in January, 1923, complaining of rather severe pain in the right eye and right frontal region, which was apparently due to hyperopia. The late changes in the left eye were of interest. There was a dark blue scar in the sclera in the lower nasal quadrant. There were many dark spicules in the posterior cortex of the lens, and the vitreous showed a good many large floaters. The view of the disc was more or less obstructed by haziness of the vitreous and by a retinitis proliferans in the upper and inner fourth of the disc. In the lower temporal quadrant was a large white scar with an old chorioretinitis and some retinitis proliferans. X-ray showed a small foreign body in the orbit.

Discussion.—W. C. BANE, Denver, referred to a man who had been hit in

the left eye by a splinter of metal which approached from the right and struck the left eyeball just external to the cornea, cutting thru the subconjunctival tissue into the sclera. X-ray indicated that a foreign body measurign 2.5 by 4 by 8 mm. had buried itself in the external rectus muscle. The point of the fragment protruded very slightly, and on snipping the tissues the foreign body was easily removed. The patient had gone home with vision of 4/48.

Glancing Injury to Eyeball by Bullet.

F. R. SPENCER and C. L. LA RUE, Boulder, presented a man, twenty-six years of age, who in April, 1922, had been struck below the left eye with a 45 caliber lead bullet, which penetrated the head and was removed from the region of the left mastoid. When seen in January, 1923 the patient stated that he was troubled with poor vision in the left eye and with occasional diplopia. It was impossible for him to entirely close the lids of the left eye, and he had diminished sensation of the whole left side of the face. He also had a slight discharge from the left ear, some continuous head noises, and slight deafness. The vision of the right eye was normal, that of the left eye 1/60. Vision of the left eye was improved by correction to 6/30. The left vitreous contained floating masses which partially obstructed the view of the disc. There was a large mass of retinitis proliferans in the lower temporal quadrant and encroaching upon the macula, with possibly a small area of detached retina. The bullet had probably coursed along the outer coats of the eyeball. Examination of the left ear showed an opaque drum head and stenosis of the external canal. It seemed possible that there had been complete severance of the facial nerve.

Discussion.—EDWARD JACKSON, Denver. The disturbance in the eye very likely occurred without any break in the sclera.

Obliterated Retinal Artery.

H. R. STILWILL, Denver, presented a colored man, aged forty-eight years, in whose left eye the superior temporal artery and its two bifurcations were obliterated, being represented merely by wide lines of fibrous tissue. The patient had come for glasses on account of headaches. The vision with correction was normal in each eye.

Discussion.—W. C. FINNOFF, Denver. Two years ago I saw a case with more extensive involvement of each eye, both the arterial and venous stems being obliterated. The only evidence of a blood stream was in the smaller vessels toward the periphery, where very thin vessels were to be seen. This man also had interstitial nephritis and a blood pressure of over 200 mm. of mercury.

MEIVILLE BLACK, Denver. In looking at Dr. Stilwill's case I at first thought that the streaks were merely exudate, but I subsequently felt that they represented obliterated blood vessels.

Intermittent Exophthalmus.

J. A. MCCAW, Denver, presented a married woman, aged twenty-seven years, who had come complaining that for the past fifteen months she had noticed that on stooping over the right eye protruded. The same thing occurred in straining, and even at times while the patient was lying down. In a few minutes the eye would return to its normal position. The corrected vision of the right eye was 5/4, of the left eye 5/15. The condition was probably due to varicosity of the veins behind the eyeball.

Discussion.—MELVILLE BLACK, Denver. The patient seems to me to have considerable enlargement of the lateral lobe of the thyroid gland. Her pulse tonight was about 110.

Detachment of the Retina.

J. A. MCCAW, Denver, presented a man, aged sixty-one years, who in August, 1922, had noticed a cloud before the left eye. This had gradually grown worse until in the latter part of October the eye had been completely blind except for a small area of the temporal field, in which he could count fingers. There was no history of injury to the eye. There was a flat detachment of the retina.

Discussion.—MELVILLE BLACK, Denver. I think there is a suspicion of

tumor in this case. The retina is not very greatly detached. It does not wave like the usual detachment. There may be a tumor near the posterior pole of the eye.

EDWARD JACKSON, Denver, also thought that there might be a flat tumor of the choroid in the back part of the eye.

W. C. FINNOFF, Denver. It seems to me that over the shallower part of the detachment choroidal vessels could be seen, and this suggests tumor.

G. L. STRADER, Cheyenne, recalled the case of a man whom he had first seen with what was apparently a flat detachment of the retina; but who had subsequently obtained a diagnosis of tumor from several other ophthalmologists, and who had returned with a sarcoma protruding between the eyelids, and had ultimately died of metastasis of the liver.

Epithelioma of the Cornea.

W. C. FINNOFF, Denver, presented a man aged thirty-five years, who had come on account of a congested and slightly painful condition of the left eye, associated with a grayish thickening in the lower part of the cornea. The eye had been cauterized by another oculist a year previously, but had continued to get worse after that procedure. On January 6, 1923, there had been an irregular gray mass about one mm. thick on the surface of the cornea in its lower quadrant. Markedly distended conjunctival vessels extended into the mass. With the corneal microscope, the vessels were seen to break up into fine capillary loops on the surface of the cornea under the tumor mass. The vision of the eye was 0.1 eccentric. The clinical picture suggested either a granuloma or an epithelioma. The tumor had been shaved off the cornea, and sections showed the tissue to be a squamous cell epithelioma. Since January 11, 1923, 200 mg. hours of radium with a filter of 0.5 mm. of lead had been used. The radium was held 1.5 mm. from the surface of the cornea. Since the removal of the tissue from the surface of the cornea, the haziness had returned to nearly its previous condition. There had not yet been time for the action of the radium. (On February 16, 1923, Dr. Finnoff reported that under the influence of the radium treatment of tumor has almost entirely disappeared.)

Binasal Hemianopsia.

W. C. and W. M. Bane, Denver, presented a man, aged fifty-six years, who had come for glasses for close work. There was marked general narrowing of the fields of both eyes, and in the nasal field of each eye the contraction practically reached the middle line. Corrected vision of 5/6 was obtained in each eye. Each optic disc was obscured at the edge by numerous hyalin deposits or "drusen," which gave a billowy appearance. Prof. Fuchs, who had seen the patient, had felt that the binasal hemianopsia was due in this case to atrophy of the corresponding retinal fibers, rather than to any lesion farther back in the optic nerve.

Discussion.—EDWARD JACKSON, Denver. The most rational explanation of some similar cases has been a fall on the back of the head or traumatism of a like character, by which the clinoid processes injured the optic nerves on each side, and in addition hemorrhage may have pressed upon the chiasm. Apparently spontaneous cases are very hard to understand.

Retinal Hemorrhage.

W. H. CRISP, Denver, presented a man, aged twenty-seven years, who had had several hemorrhages from the retinal vessels of the right eye. The patient was a highly expert telegrapher. The first attack had been at the beginning of July, 1922, when there had been several exudative patches on the vessels, and a circular hemorrhage of about a quarter disc diameter on an upper temporal vessel above the macula. The left eye had always been relatively useless, and even with correction of a high astigmatism had vision of only 5/15 part. The vision of the right eye had rapidly improved from 5/30 to 5/5 part. A Wassermann test was negative. Several bad teeth were removed. The hemorrhagic patch on the upper temporal vessel remained practically unaltered for several weeks after the vision returned to normal.

A second and more serious attack occurred in the latter part of November, the vitreous being clouded and containing several strands and masses of opacity. There were several very large glands on the right side of the neck, and the right tonsil was found to contain definite pus. Altho the patient was a native of Colorado and of apparently healthy parentage, his chest was found by X-ray to contain extensive pleural adhesions and evidences of cicatricial tissue in the lung, which probably dated from an attack of pneumonia in childhood. The vision of the right eye, which in the second attack had fallen to 5/30, rose in the early part of December to 5/10 most. Tuberculin was administered in very small doses and without producing any reaction. There had on two or three occasions seemed to be a moderate improvement in vision twenty-four hours after the tuberculin administration.

On December 30 the patient came in with the statement that the day before he had thoughtlessly run for a street car, and had at once noticed a marked reduction of vision. The vision on this date was 5/30. No connection of the sudden falling off in vision with the use of tuberculin seemed possible, because it had then been four days since the last administration, and two days after that administration the vision had been 5/10 part. After removal of the tonsils on January 12, the glandular enlargement in the neck had greatly diminished, but the vision showed no improvement.

Discussion.—E. M. Marbourg, Colorado Springs, suggested trying elixir of calcium.

W. C. Finoff, Denver, thought the dose of 1,10/000 of a mg. of tuberculin too large to start with a case of retinal tuberculosis. The prognosis seemed to be extremely unfavorable in this case. It would be proper to consider removal of the enlarged glands in the neck.

W. A. Sedwick, Denver, would not favor immediate removal of the glands, but would first administer syrup of the iodid of iron.

Blasting Injury.

W. H. Crisp, Denver, presented a miner, aged fifty-two years, who, on September 26, 1922, had been injured by a dynamite charge which had exploded within a few feet. Both corneas were heavily peppered, principally with quartz particles. The right eye had had a traumatic cataract, and the presence of several quartz particles inside the eyeball, some of them on the anterior capsule of the lens, had led to severe chronic iridocyclitis, for which removal of the right eye had been performed on December 27. The left eye was still disagreeably inflamed, and in this eye there was a particle of rock at the inner edge of the pupil, the iris at this point being adherent to the particle and to the lens capsule. Should any attempt be made to remove the intraocular particle?

Discussion.—The consensus of opinion was in favor of leaving the eye alone as long as possible.

W. H. Crisp,
Secretary.

BALTIMORE CITY MEDICAL SOCIETY

Ophthalmological Section

February 21, 1923.

Dr. Herbert Harlan presiding.

Cicatricial Entropion.

Dr. H. K. Fleck presented this case following X-ray treatment of an epithelioma of the left lower lid near the inner canthus. After dissecting out the scar tissue, he sutured the lids together, and inserted a transplant, Wolfe graft taken from the upper lid, the results being very satisfactory.

Congenital Cataract.

Dr. E. A. Knorr presented a young white man with bilateral congenital cataracts and 20/20 vision in each eye. In the left eye the opacity had a fusiform shape.

Congenital Ptosis.

Dr. Knorr presented a white child of 5 years with bilateral congenital ptosis, for which a Hess operation had been performed. By using the frontalis fibers, he was able to open the eyes sufficiently to get about without tilting the head backward.

Coloboma of Macula.

DR. KNORR showed a white girl of 12 years with a circular absence of the choroid at the right macula, which he had diagnosed as a congenital coloboma at the macula. The vision in this eye was 10/200.

Myopia with Retinal Detachment.

DR. KNORR. A white man of thirty-five with low degree of myopia had a retinal detachment that had occured six months previously. At present time it is practically complete, with vision of motion only. He had aspirated the subretinal fluid and the only result that he could notice was in reducing the tension.

Retinal Hemorrhage.

DR. KNORR. A white man of 64 presented with profuse retinal hemorrhages in the superficial layers of the retina of his right, and only eye. Systolic blood pressure was 138. Urine negative. Tension normal. His diagnosis was thrombosis of central vein of retina.

Discussion.—DR. H. E. GIBBONS. I think that the case shown as thrombosis of the central vein of the retina is in reality one of hemorrhagic glaucoma that has not shown tension as yet.

DR. C. A. CLAPP. I should like to ask Dr. Knorr whether he has had any experience with the Motais operation in cases of congenital ptosis. It seems to me in a case of this sort, where the superior rectus seems to be functioning well, that it would be an ideal procedure. In reference to case three, I rather differ from Dr. Knorr in his classification, as I believe the case to be one of chorioretinal atrophy, and due to an inflammatory reaction rather than a congenital arrest of development; this opinion is based upon the fact of considerable pigment being present in the center of the lesion and its being situated outside of the region of the choroidal cleft. The inflammatory reaction, however, may have occured intrauterine.

I quite agree with Dr. Knorr in his diagnosis of case five as one of thrombosis, and if increased tension does develop, it is secondary and the case should not now be classed as one of hemorrhagic glaucoma.

DR. E. A. KNORR. I have have no experience with the Motais operation in congenital ptosis, but do not believe it would be as satisfactory as the Hess operation, even if this does leave considerable scarring, as it seems to me the superior rectus is not strong enough to raise the rather heavy lid.

Intraocular Sarcoma.

DR. HERBERT HARLAN presented a man of 50 years who broke his glass five months ago with some trauma of the left eye. Two months ago he reported that the vision in this eye had become dim, and examination showed a fixed detachment of the retina at the nasal side of his left eye, with a few dilated conjunctival vessels over the same region. The tension is normal and transillumination shows a definite clouding. His vision is now 10/200. While his experience with intraocular sarcoma is that they usually have metastasis, he believes this eye should be taken out. He had never seen a local recurrence following removal.

DR. C. A. CLAPP. Out of four cases followed, all showed metastasis. The longest time which elapsed before the secondary tumor was five years.

DR. E. E. GIBBONS had seen two cases with local recurrence in the orbit.

Corneal Opacity.

DR. E. E. GIBBONS presented cases of transverse zonular opacity of the cornea, and secondary glaucoma following closed pupil.

C. A. CLAPP, Secretary.

THE OMAHA AND COUNCIL BLUFFS OPHTHALMOLOGICAL AND OTO-LARYNGOLOGICAL SOCIETY.

November, 1922.

DR. DEAN, President.

The evening was devoted chiefly to a report by Dr. Clarence Rubendall of the Bárány Lectures in Minneapolis. Several nose and throat cases were reported.

Corneal Degeneration.

DR. JAMES M. PATTON showed a case of unusual corneal degeneration in a man of thirty-seven. His vision was 20/50; with correction 20/20 in both eyes. The vision of the left eye had been getting worse for the past six months. The right eye showed a superficial band of opacity extending around the upper half of the limbus. It somewhat resembled an arcus senilis. The left eye has a similar band of opacity, but much more extensive, the triangular area of opacity extending from the upper portion of the ball over the whole outer third of the cornea. In this opacity were numerous shiny bodies resembling cholesterin crystals. The slit lamp examination shows the opacity in the left eye to be made up of fine subepithelial dots and lines with very numerous shiny refractile bodies, which are probably cholesterin crystals. There was nothing in the history that could account for the condition, and it was considered a peculiar degeneration of the cornea, resembling that sometimes called arcus juvenilis.

Discussion.—DR. DEAN suggested using a strong solution of cocain on the cornea, to see whether the opacity would peal off with the epithelium. In a case which he had some time ago, the epithelium which reformed on such an area was much clearer than the area had been before.

ROYAL SOCIETY OF MEDICINE (London).

Section of Ophthalmology.

Friday, February 9th, 1923.

MR. A. L. WHITEHEAD, President.

This was a clinical meeting, held at the Royal London Ophthalmic Hospital.

Optic Atrophy After Herpes Ophthalmicus.

MR. LESLIE PATON showed an interesting example of this condition. The patient was a married woman, aged 67. Last Easter she had a bad attack of ophthalmic herpes, which affected all the branches of the first division of the 5th nerve on the left side. There were faint nebulae on the cornea, which were left by corneal vesicles. On recovering from the herpes, she found the vision of the left eye was lost. When first seen she could only perceive hand movements with that eye, and the field was evidently very limited. The left pupil did not react to direct stimulus, but did so to consensual stimulus. There was a slight reaction to concentrated light. With the ophthalmoscope an opaque white disc was seen, with fairly clean cut edges. The lamina cribrosa could not be seen. There was no evident disturbance of retinal pigment around the edges of the disc, but the vessels were of reduced caliber.

He said true optic neuritis as a complication of herpes ophthalmicus was a comparatively rare event. He had not seen a case until last Summer, when Mr. Adams, of Oxford, sent him a patient, a lady aged 35, who had shingles on the right side, commencing on May 15th. The whole first division of her fifth nerve was affected. After the subsidence of the herpes in that eye, it was found to be quite blind; the pupil was semidilated, and was not reacting to light. Her tension, when he saw her, was quite normal. The ophthalmoscope showed an absolutely atrophic disc, and he had yet to hear of even a slight recovery of vision in that eye

He had found that quite a number of these cases had been published. In Sir Jonathan Hutchinson's classical account in the Ophthalmic Hospital Reports, Vol. v, 9. 191, that authority said that the globe of the eye was never affected except in cases where the nasociliary branch of the first division of the fifth was involved; but, tho this was a good general guide to prognosis, it was not universally true. In the next volume of the same reports was a description of a case by Bowman, but this, and some others, were probably not primary infective herpes, but herpes of a secondary nature. Mr. Paton gave a synopsis of a number of other cases.

Evidence of other cranial nerve involvements was much more frequently found. In last year's epidemic, he had several cases of diplopia, also one case in which the 6th nerve was involved.

Statistics showed that the 3rd nerve was much more frequently involved; there was also affection of the nerve supply to the iris and ciliary muscle in some. It was commoner, in this disease, to find a smaller than a semidilated pupil. In one very severe and generalized case of herpes, now under his care, the corneae were, so far, quite free. Another case had well marked deep keratitis with iridocyclitis, also there were cases with hypotony. The latter were mostly those in which the iris and ciliary body were involved in the congestion. Quite recently he saw a case in which the whole of the first division of the fifth and the whole of the second division were affected. The changes in the optic nerve seemed to be secondary to the peripheral changes in the circulation produced as a result of the herpes.

In regard to any association there might be between this affection and chicken pox, there was need of further information, but it was accumulating; he had several times been able to trace what appeared to be a causal relation.

Discussion.—MR. PICKARD (Exeter) spoke of a very severe case of herpes ophthalmicus, resulting in complete blindness. He said it was commonly believed in Devonshire that there was a relationship between herpes and chicken pox.

MR. W. H. MCMULLEN described a case of his own, now under care, in which optic atrophy had followed herpes. There were a few spots of keratitis punctata, probably fairly old, as much of the area was brown, and the disc somewhat pale; it was now white.

Cicatrization of the Retina.

MR. FRANK JULER showed this condition in a child, who was sent from school for examination in the ordinary way because of defective vision, which was 6/36 in the left eye. The ophthalmoscope revealed a half circle of fibrous looking material involving the macular region. The tension was plus 2, and there were hemorrhages along the edge of this tissue. Six months previously the eye had been struck by a rubber ball, and the speaker thought the condition was due to trauma; there might have been rupture of the retina and the choroid beneath, and the hemorrhage from the rupture had now become organized.

Bilateral Tubercle of Choroid in a Kitten.

MR. J. B. LAWFORD AND MR. HUMPHREY NEAME showed specimens from a kitten which had tubercle of both choroids, with detachment of retina. The kitten had not wasted, or refused food. It was chiefly fed from the household milk supply. The sight defect developed rapidly, and was known because the kitten walked into a sunken tub of water in the garden. The pupils were dilated and apparently motionless to light; testing by artificial light in a darkened room gave the same result. The corneae were were bright, and the lenses clear. After the kitten had been chloroformed out of life, the eyeballs were removed and placed in Zenker's fluid.

MR. NEAME said he found that the posterior part of the choroid was definitely thickened. The retina was completely detached. There was a small focus of infiltration on one side of the ciliary body. The minute structure was granuloma, in which epitheloid cells predominated. He was unable to find tubercle bacilli in the section, a common experience, especially in animal's eyes.

Band Keratitis.

MR. A. C. HUDSON showed two cases with this condition. The question of interest was the results of operations. In one of the patients he operated by scraping away the film, and the result was very satisfactory, for whereas the sight had been less than 6/60, it was now 6/12. The film was not definitely calcareous, but no very definite decision had been come to about it in the laboratory. The vision of the other patient was not so bad as in the one operated upon, but he proposed to do something for her.

Discussion.—MR. LESLIE PATON agreed as to the toleration of these patients for scraping; as also did MR. AFFLECK GREEVES.

Atrophic Patches at the Macula, Possibly Tuberculous.

MR. WILLIAMSON-NOBLE showed a married woman, aged 36, who came to hospital giving a long history of operations in various parts of the body for tuberculous disease. Vision in both eyes was reduced to 6/60; and in the right eye the internal limiting membrane could be seen to be pushed forward 3 D.

Cyst of Sclerocorneal Margin.

MR. KENDALL exhibited a boy, aged 17, who came on account of feeling a foreign body in the eye, which he regarded as a blister. A cyst of the sclerocorneal margin was discovered. In the ordinary way it was covered by the lid. The boy had no recollection of having received an injury to the eye.

Discussion. — SIR WILLIAM LISTER commented on the similarity of this case to one of implantation cyst following an advancement. In some of these cases there had been an injury in childhood, which had passed as of little account, and that may have been the starting point of the trouble. A numerous series of cases illustrating changes due to congenital defects and injuries were also examined.

H. DICKINSON.

SOCIÉTÉ D'OPHTALMOLOGIE DE PARIS

November 19, 1922.

DR. POLACK, President.

Pulsating Exophthalmos.

DR. CAUCHOIX called attention to the anatomicoclinical forms of this condition and their treatment. Autopsies upon patients thus affected are not very numerous. Of 41 cases he had found recorded, 15 showed communication between the internal carotid and the cavernous sinus, which might have been due to trauma or spontaneous. In one case a circumscribed aneurysm of the carotid was situated before the artery entered the sinus; in 2 others there was aneurysm of the ophthalmic artery. In 6 cases a vascular tumor had entered the anterior cerebral fossa, and might have passed into the orbit thru destruction of its superior wall. In a certain number of cases, no marked arterial lesion or tumor had been found. In one case there was only great dilatation of the cavernous sinus and a dilated varicose ophthalmic vein. In 4 cases venous dilatation was the only abnormal condition found.

To determine what symptoms were connected with each of the anatomic conditions is difficult. The same bruit was present in various cases of arteriovenous and circumscribed arterial aneurysms. The sound was affected by the size of the opening in the arterial wall.

Varied plans of treatment had been attempted. Ligature of the carotid above and below the aneurysm had been followed by death. Electrolysis in one case had caused the symptoms to disappear; in another it had slightly ameliorated them. Injections of gelatin serum have given some successes. Digital compression of the carotid might be reserved for spontaneous cases with altered vessel walls. The periods of compression should at first be short, not over two minutes; later they might be lengthened to 15 minutes. This treatment was of value to establish collateral circulation before ligature of the carotid.

Compression of the dilated veins in the orbit with or without compression of the carotid might also be tried. Ligation of the common carotid has been more frequently employed than any other operation. The mortality is about 10 per cent. Among 5 cases thus treated by Cauchoix, one doing well at the time suffered from hemiplegia of the opposite side 4 months later. It was important that the ligature should be tightened progressively, so as not to cause sudden obliteration of the vessel. Perfect cure by such ligation is rarely obtained. Disappearance of pulsation, soufflé, venous dilatation, pain in the eye and orbit, and improvement of vision are secured. But generally there remains some exophthalmos, dilatation of the veins and paresis of the ocular muscles. Recurrences are rather frequent.

Should ligature of the internal carotid be preferred? It favors establishment of an anastomotic circulation. Among 8 cases there were 5 cures, 2 failures and 1 partial success. Ligature of both internal and external carotids gave one death, three failures and 7 cures. In 20 cases of ligature of both carotids there had been but 5 cures.

Ligature of the ophthalmic vein, where it connects with the facial, has been reported in 15 cases, in 13 of which it resulted in complete cure. The operation, however, seems applicable only to cases in which there is dilatation of the veins appreciable to both sight and touch.

Secondary Cataracts.

DR. V. MORAX read a paper on this subject. He would divide these into 2 classes, lenticular, containing lens fibers; and capsular, produced by modification of the lens capsule. A month after cataract extraction the pupil may be clear and corrected vision normal, but subsequently there may be opacification of the capsule, or the pupil may be occupied by a gray opacity that interferes with ophthalmoscopy and reduces vision. The secondary cataract may be immediate, or it may develop late. In a series of 111 cases, 144 extractions were done. In 118 extractions of senile cataract there were 39 cases of total secondary cataract, of which 12 were operated on by discission or extraction. Of 20 cases of presenile cataract, 7 had secondary opacity, and of 6 juvenile, there were capsular opacities in 5.

To illustrate the nature of the changes in the lens and capsule causing secondary cataract, ten cases were discussed in detail showing large accumulations of lens fibers in the periphery of the capsule, with clear center to the posterior capsule and absence of the anterior in several cases. In one case the remains of incarcerated vitreous extended into the pupil. In another there was thickening of the anterior capsule which remained. In still another, tissue united the anterior and posterior capsules, the nuclei it contained indicating it was not derived from lens fibers. In still others the relatively clear capsule showed thickenings, that greatly reduced the visual acuity. As to the causes determining the formation of secondary cataract, analysis of statistics was without influence. The proportion of cases was practically the same, whether the extraction was simple or with iridectomy. Removal of the anterior capsule during extraction, while of value, does not always prevent secondary cataract.

Operations for secondary cataract were discussed, including incision of the capsule, perforation with punch, extraction of the capsule, and incision or removal of the capsule with iris. The dangers and complications of these included infection, intraocular hemorrhage and glaucoma, which may follow either operation. The author's choice, where practicable, was first capsular discission, then extraction of the capsule and in certain cases, where necessary, incision of both capsule and iris.

Discussion.—E. LANDOLT agreed with the views of the author. He would substitute for "maturity" the term "operability" of cataract; and this depended, not on the opacity of the lens or the age of the patient, but on the age of the cataract. For division of the obstructing membrane he used a slender needle, with a shank exactly filling the wound made in the cornea. For extraction of capsule he employed forceps, slightly larger than iris forceps, one blade of which terminated in a cutting needle point. With this the opening was made in the cornea, and the closed forceps introduced into the anterior chamber. The needle point was then made to penetrate the capsule, which was grasped by pressing the other blade of the forceps against it. Gently and delicately executed, the operation had not been followed by complications.

VINSONNEAU said that the destruction of synechiae should precede the division or extraction of the capsular membrane. He found secondary cataract less frequent after preliminary iridectomy.

ROCHON-DUVIGNEAUD believed the absence of all inflammation was one of the first conditions for absorption of the remaining lens substance, altho sufficient absorption might occur with moderate inflammation. He could not agree that the maturity of the cataract was a matter of indifference. The opacity and softening of the crystalline permits its easy and complete separation from the capsule. But in spite of these apparently favorable conditions, secondary cataract sometimes occurred, yet an immature cataract will sometimes separate completely. A late form of secondary cataract appears, from one to three years after extraction. He had examined a series of these extracted with forceps. They all showed wide opening of the anterior capsule, which was thickened and its epithelium preserved. The posterior capsule seemed thickened with a finely laminated tissue. The interference with vision seemed to be due principally to

change in refraction, rather than diminished transparency.

Simple secondary cataract, free from adhesions to the iris, is not sufficiently drawn upon by the zonule to keep open the incision. The use of forceps scissors gives a better result, if the cut is made perpendicular to the direction of traction. Removal of the capsule with forceps is most certain to be satisfactory.

F. TERRIEN agreed, that the operation of choice for secondary cataract was the extraction of the capsule. Other procedures were to meet certain conditions. The choice of the forceps was important. He preferred those of A. Terson, which permitted the removal of the whole anterior capsule with gentle traction. But partial removal may give as good result. The prevention of secondary cataract must be considered in choosing an operation suited to the particular case. Complete maturity is not essential, but should be attained if it can. During operation aseptic precautions are important. With operation asepsis and prevention of post-operative inflammation must be sought.

F. DE LAPERSONNE also found maturity of the cataract not essential after 60 years of age. He agreed that it was advisable to extract as much as possible of the anterior capsule.

CH. LAFON. Altho not dangerous it is disagreeable to have to submit to a secondary operation. When, after operation, the iris dilates fully under atropin and there is little redness or pain, the remaining soft masses are completely absorbed. When the pupil dilates poorly and the conjunctiva is red and the eyeball painful, there is danger of secondary cataract. The risk from infection is very slight. Dyscrasiae favor the development of exogenous infection. Preparatory treatment of dacryocystitis or simple lacrimation is important.

The number of secondary cataracts is reduced when the lens is hard and the field of the pupil is clear at the end of the operation. The yellowish, relatively transparent lenses, are those that have reached operative maturity. Of 100 such cataracts operated on, but 7 gave secondary opacities. Secondary cataract with involvement of the iris may depend on chemical poisons, or on cortex playing the role of a foreign body in the anterior chamber. Where the two cataracts were advancing with equal rapidity, he would do iridectomy and a ripening operation on one of them. In operating for secondary cataract, the knife or needle should never enter thru clear cornea, but thru the limbus. For thick membranes he prefers the capsulotomy by de Wecker's instrument. Extraction of the capsule drags on the zonule, and ciliary body. The punch forceps of Vacher avoid such traction.

VALOIS referred to the value of lavage in preventing secondary cataract and other complications. Secondary cataract was not entirely prevented, but was rendered less frequent.

A. TERSON referred to various points in the extraction operation, at which the danger of secondary cataract could be diminished. Incomplete cataracts give more secondary cataracts than the complete, and the earlier ones give the worse secondary. The important criterion as to operation is the condition of the other eye. The patient follows his usual occupations until he can no longer do so. Then a preliminary iridectomy is done. The farther the cataract is advanced, the better the result of operation is appreciated. The early operation entails greater risks in spite of a few or many successes.

C. FROMAGET asked what was the best means to improve the vision of the operated eye? Discission with the needle or hook needle should be condemned as dangerous, and such instruments banished from the armamentarium. They cause contusion of the cornea, drag on the capsule, irritate the ciliary body and leave insufficient openings. One should never drag the capsule, but cut without any traction. The capsule should be cut with a perfectly sharp instrument as the cataract knife used with a sawing movement. Thus large openings are secured, which remain clear. Capsulotomy with a Graefe knife has given good results. If one incision is insufficient the second can be done. For complicated secondary cataracts the extraction is chosen, using the forceps scissors.

KALT found, in young patients, secondary cataract was the rule. Removal

of the membrane with forceps at the time of extraction, gives no marked advantage. The opacities are due, at least in part, to masses of cortex protected from the action of the aqueous by proliferation of the capsular epithelium. Vision may be reduced to counting fingers.

DUVERGER, after experience with both methods, thought the discission of the membrane should supplant extraction; or better still, the division of the capsule with a Graefe knife. He found it impossible to extract secondary cataracts completely with forceps, without producing traction or detachment of the capsular incision. The needles of Knapp and Landolt cut rather than drag the membrane. It is the method that can be supplied to either thinned or thick capsules or iris exudates.

POLACK had noticed that a transparent capsule, that interfered little with the view of the fundus, might reduce vision to 0.1 or 0.2. He thought this might be from metamorphopsia due to folds, or optical irregularity of the capsule.

MORAX, in closing, said; if he had regarded as secondary cataract cases in which vision was reduced below 0.3, he obtained the lower percentage of Lagrange. His sections of eyes showed that more often it was the posterior capsule rather than the anterior, which was the seat of changes attended with alteration of vision.

ABSTRACTS.

Harry, P. A. Papillitis Due to Tonsillitis. British J. of Ophth. 1922, v. 6, p. 216.

The ages of the patients reported were 27, 30 and 35 years respectively. The notable features were the intensity of the papillitis, the unilateral character and completeness with which the condition cleared up. Sodium salicylat and treatment directed to the tonsil condition, were the remedies used. D. F. H.

Hagen, L. Regeneration of Aqueous in Human Eye. Klin. M. f. Augenh. v. 66, 1921, p. 493.

Hagen repeated his experiments on diseased human eyes, viz., iridocyclitis, acute and chronic absolute glaucoma, with regard to the 3 important points: 1. The rapidity by which the drawn aqueous is replaced by the blood circulation. 2. The contents of albumin and fibrin of the newformed aqueous, in comparison to the primary aqueous. 3. The formation of vesicles in the epithelium of the ciliary body or iris. The regeneration in the diseased eyes as compared with normal occurred very rapidly, most rapidly in acute iridocyclitis. The regenerated aqueous showed a marked increase in albumin and secretion of fibrin. In two cases of absolute inflammatory glaucoma, he found the vesicles on the posterior surface of the iris, not on the ciliary processes; and only in one case a few small epithelial vesicles at the anterior portion of the ciliary body.

The experiments demonstrated that the regeneration of the aqueous, under pathologic conditions entirely differs from that in normal human eyes; but is similar to that in normal eyes of animals, in direct contrast to normal human eyes. But while in animals the regeneration takes place exclusively from the ciliary body, it occus in the human eye chiefly from the iris. This forces us to regard the iris as the most important secretory organ of the aqueous, or to acknowledge that this pathologic transudation of an albuminous aqueous does not prove anything with regard to the physiologic conditions. Greeff's vesicles on the ciliary body of the rabbit, have certainly no further significance, for the study of the physiologic conditions in the human eye. The differences of the regeneration of the aqueous between the human eyes and the eyes of animals are so great that in this point the results of animal experiments cannot be directly applied to the human eye.

C. Z.

American Journal of Ophthalmology

Series 3, Vol. 6, No. 6. June, 1923

PUBLISHED MONTHLY BY THE OPHTHALMIC PUBLISHING COMPANY

EDITORIAL STAFF

EDWARD JACKSON, Editor,
217 Imperial Bldg., Denver, Colo.
M. URIBE-TRONCOSO,
226 W. 70th St., New York City.
MEYER WIENER,
Carleton Bldg., St. Louis, Mo.
CLARENCE LOEB, Associate Editor,
25 E. Washington St., Chicago, Ill.
CASEY A. WOOD,
7 W. Madison St., Chicago, Ill.
HARRY V. WÜRDEMANN,
Cobb Bldg., Seattle, Washington.

Original papers, correspondence, and other scientific communications should be addressed to the Editor. Books for review may be sent to any member of the editorial staff. Reports of society proceedings should be sent to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Ill. News items should be sent to Dr. Melville Black, Metropolitan Bldg., Denver, Colo.

Proof should be corrected, and returned within forty-eight hours to the printers. Reprints may be obtained from the printers, Tucker-Kenworthy Co., 501 S. La Salle St., Chicago, Ill., if ordered at the time proofs are returned. But reprints to contain colored plates must be ordered when the article is accepted.

Copy of advertisements must be sent to the Manager by the fifteenth of the month preceding its appearance.

Subscriptions, applications for single copies, communications with reference to advertising or other business, should be addressed to the Manager of Subscriptions and Advertising,

JEAN MATTESON, Room 1209, 7 West Madison Street, Chicago, Ill.

RETINOCYTOMA OR GLIOMA.

The latest designation for malignant disease of the retina is here opposed to the term most widely used. A name is given to something to assist people to understand each other when they talk about it. The name becomes associated with certain characteristics, and separates the thing named from others that differ from it. That is the reason for giving names in general. It should guide in the choosing names for pathologic conditions and tumors. The term "glioma" was given to certain tumors arising in the retina under a misapprehension of their characteristics, and has not assisted to an understanding of them; but has caused confusion that has persisted for sixty years, in spite of clear, definite descriptions of the tumors, that have long existed in ophthalmic literature.

As it is stated by Collins and Mayou (Pathology and Bacteriology, p. 115): "The new growths of the retina present very marked differences, both clinically and histologically, from gliomata of the brain; e. g., they occur only in early life, are more highly malignant, and are composed of an altogether different type of cell. It seems, therefore, unfortunate that they should have received the same name."

It was unfortunate that the mistake ever occurred, and it is foolish to perpetuate it. It has caused confusion for two generations and is still causing it among students and general pathologists. Within the last year the writer has been in correspondence with two oculists and two general pathologists on this matter, and an examination of books on general pathology now used by teachers and students shows that the uncertainty and confusion are still being perpetuated.

It came about in this way. Virchow, whose cellular pathology pointed out the dominance of the cell in tumors, as in the growth of normal tissues, described the glial cell and the tumors in which it dominated in the brain and spinal cord, and properly called them "gliomas." He also thought the glia cells of the retina, which is embryologically a part of the central nervous system, gave rise to the retinal tumors in question; and hence he applied to such tumors the term "glioma of the retina." He thought the retinal tumors differed from those of the brain as a medullary from a scirrhus cancer. The weight of his authority and the lack of detailed studies of these tumors by many general pathologists, together with a failure to take into account the clinical characteristics of the cases of retinal

tumor, has perpetuated the error and led to a confusion of description that is today almost universal in textbooks on general pathology.

The clinical characteristics of these tumors of the retina were clearly defined long before the cellular pathology of tumors had been thought of. Mackenzie (Diseases of the Eye, American Edition, 1833, p. 453) under the head of "Encephaloid Tumors," wrote: "This disease not unfrequently affected the globe of the eye, causing an enlargement of it, with destruction of its internal organization; and that if the eye were not extirpated, the sclerotica burst, a bloody sanious matter was discharged, and the patient sunk under the complaint."

Medical journals for the last half century have contained clear accounts of the cases presenting these characteristics; and students of the pathologic histology of the eye have given good accounts of their distinctive anatomic features. But the writings of Virchow and the general pathologists who accepted his views have puzzled and confused those whose own observations were more accurate. Norris (1872) reporting his case to the Philadelphia Pathological Society, almost ignored its pathology. Hirschberg (1896) uses the old term "Mark Schwamm," medullary cancer, of the retina. Brailey (1881) wrote: "Its cells are not unlike the retinal granules in structure and size. Their farthest extension into the adjacent retina may either be in the granules, inner or outer, or in the nerve fiber and cell layers. Glioma would thus appear to be a tumor derived from some form of nervous tissue, and not from the ordinary fibrous connective tissues. For tho some of the bodies constituting the inner granules are undoubtedly the nuclei of the connective tissue fibers of Müller, yet the great majority are, like the outer granules, undoubtedly nervous."

Flexner (1891) reported on the eye sent to him for examination as one of a "case of peculiar glioma." He described a form and arrangement of cells that he referred to as "rosettes." In this case the tumor seemed to originate in the external two layers of the retina, the layers regarded by some as not being true nervous tissue, but "neuroepithelium." He suggested, therefore, that such a tumor should be called a "neuroepithelioma." Wintersteiner (1897) adopted both the terms, "rosettes" and "neuroepithelioma." He brought together from the literature 497 cases and reported on thirty-one of the eyes which he had examined. He concluded that the tumors started in the outer layers, the "neuroepithelium" of the retina. But others have found very good evidence that they may originate in other layers of the retina; and the mass of cells composing such growths most nearly resemble the cells of the nuclear layers of the three months fetus. Verhoeff (1904) pointed out that the rosettes resemble not embryonic, but rather the fully developed neuroepithelium. They are probably not the cell masses that chiefly carry the malignant tendency of the tumors in question.

In view of the confusion with regard to this form of malignant disease of the retina, the failure of general pathologists to recognize it, because it differs radically from glioma as they have studied it in the brain, and the large number of other names, ten to twelve, that have been suggested to indicate it, Mawas seems justified in proposing the name "retinocytoma." It does not add to the usefulness of a name to have it lengthened by being made to carry too much information. While the term "dysembryoplastic retinocytoma" carries a conception of its origin that may be enlightening, it is badly handicapped in competition with the short easy word "glioma." It would favor a better understanding of this subject and remove a cause for misapprehension, if the term "glioma" were given up to the brain tumors that have a superior claim to it, and a more appropriate term found for the malignant tumors of the retina.

E. J.

OCULISTS, OPTOMETRISTS AND OPTICAL FIRMS.

Epoch making acts usually are not recognized as such until long after their occurrence. As a rule, their significance is appreciated only after their effect upon subsequent events has had time to manifest itself. But it is possible that we

who are at present engaged in the practice of ophthalmology may be witnessing such an epoch making act, in the position recently taken by a well known Chicago wholesale optical house. Briefly stated, this firm has closed out all of its accounts with optometrists, and has announced that it will fill prescriptions only when they are signed by members of the medical profession. In addition, it proposes to inaugurate a campaign, by means of which the public will be educated as to the differences between oculists and optometrists, and the essential limitations of the latter.

Heretofore, oculists have always been on the defensive against the attacks of the optometrists. In common with other "get knowledge quick" groups of pseudo-medical practitioners, the optometrists have been waging an offensive (in both senses of the word) campaign to obtain legal recognition in the several states of the union, and hardly a year passes without the oculists of some state being compelled to appear before its legislature to combat their activities, sometimes unfortunately to no avail. Whenever the oculists have appeared in an active capacity, it has been before some medical society or in some medical journal, informing their confreres of facts which they already know. They have been barred from the public press, partly from fear of appearing unethical, and partly because the public press, from motives of self interest, or otherwise, has refused to present their side of the question.

This anomalous position has long been recognized, and at the 1921 meeting of the American Academy of Ophthalmology and Oto-Laryngology, a Committee on Publicity and Service was appointed to consider the question of the proper method of acquainting the public with necessary medical facts. This is a step in the right direction, and if it is assisted by the action of the nonmedical organizations, so much the better. The present status of Refraction is an evolution from the days of the itinerant spectacle vender; but the instruction of the consumer has not kept pace with the progress of those whose duty and privilege it is to supply them with correcting lenses. Anything which tends to alter this state of affairs should be welcomed.

Another phase of this firm's action is its refusal to supply lenses to optometrists. Oculists in the smaller cities, and those in the larger ones who supply their patients with lenses thru the medium of wholesale optical houses have been forced to obtain such lenses, etc., from the same firms which supply optometrists. Not only is this true, but it is stated that some firms make a special, lower, price to optometrists, thus introducing the element of unfair competition. Optometrists are organized for action; oculists, for science. If oculists would realize what a force their united numbers could exert, by patronizing firms which cater exclusively to them, a revolution would be brought about in the attitude of other firms. They would realize that oculists would have a choice between "fair" and 'unfair" firms, and many of them would undoubtedly swing into line. A decided check would be given to the activities of optometrists, for when an army is engaged in preventing the turning of its flank, it has little leisure for aggressive action. When a firm states by words and acts that it does not desire the accounts of a certain group of men, such action exerts a moral force beyond its immediate and direct results. In defending themselves from the implications produced, optometrists will hardly have time to attempt new inroads on the medical profession. C. L.

WORKERS IN OPHTHALMOLOGY.

In August, 1922, three notable Americans ended their labors as students and practitioners of ophthalmology. Widely different in tastes and mental characteristics, as in physique and manner of life, they were united in common hopes and efforts to advance their profession and thru it to help their fellow men. They all worked with energy and devotion in the service which they had chosen; and they deserved more than a passing thought from their fellows. All have been mentioned in these pages, but it is well to recall them here, to fix attention on their work as among the important and significant things occurring in ophthalmology in our time.

GEORGE MILBRY GOULD came into the medical profession in middle life and never lost his keen interest in things that were outside its special field. As editor of general medical journals, compiler of dictionaries, student of anomalies and curiosities of medicine, author of books on philosophy, biography and general literature, he reached notable success in many directions. What such energy might have achieved, if directed into one channel is an idle question. One who could so concentrate his effort would not have been George M. Gould. His energy confined to one channel would never have developed as it did. His positive, dogmatic form of statement may have been emphasized by his early work in divinity school and pulpit, but it was an integral part of his character. He was always an individual worker; never did much in a public clinic and was rarely seen in medical societies, altho warm hearted and cordial towards friends.

JUAN SANTOS FERNANDEZ, born in a small town of Cuba, did not seem chosen by external circumstances for leadership in a highly specialized branch of science. But by blood and immediate environment he held connection with European civilization; and at 18 sought its higher scholastic opportunities and influences, to work for the formative ten years of his professional life among the teachers and traditions of Madrid and Paris. Then returning to Havana, he led a long and busy life of practice, teaching, writing, editing and fostering ophthalmology, public health and general science. From his western island field of labor, he became easily the leading ophthalmologist, speaking the language next to English most widely spoken thruout the civilized world. A most fecund writer, he was a leading figure for more than a generation in the ophthalmic and general medical associations of Cuba and Spain. His influence on the profession and public was largely exerted thru scientific societies.

ANDREW EDWARD FORSTER lived a professional life outside of the publicity of professional gatherings and literature; but one that teaches a lesson needed by ophthalmologists, the majority of whom are somewhat separated from those who are working on the same lines. Adding to the course of a first class medical school a year as intern in a general hospital, he gave fifteen years to practice of general medicine and surgery. But he kept his ability to study, while he was developing the power of independent initiative and exact judgment. For his course in ophthalmology, he chose, not what had been the ideal in 1905, but the best developed in 1920. In less than two years he won honorable recognition in his newly chosen field. His two papers published last month are valuable summaries of the present state of our knowledge of two important subjects, and the original experiments with which they culminated were real additions to that knowledge. E. J.

BOOK NOTICES.

The Ophthalmology of General Practice. Malcolm L. Hepburn, M.D., F.R.C.S., England. Surgeon Royal London Ophthalmic Hospital, etc. 196 pages, 8 color plates, and 9 illustrations in the text, New York, Paul B. Hoeber.

This book is written from a special point of view. Always interested in ophthalmology, its author sought, while in general practice, to meet the ophthalmic needs of patients who came to him. The books he turned to gave excellent advice as to treatment, in cases he was unable to diagnose. He, "therefore, gave up treating diseases of the eye altogether." This book is written to meet the needs of the general practitioner; to "help him to distinguish between cases which he can treat himself and those which he must refer to a specialist, and, in both groups of cases, may give him the practical guidance which he requires."

The central thought of the work is this: "I would strongly urge upon the general practitioner the importance of making himself familiar with all the methods of ocular examination. My experience of general practice has taught me that all mistakes in diagnosis are the outcome of imperfect knowledge of how to collect the various data which are necessary to the formation of an opinion. Therefore, I advise the practitioner not to waste his time in reading the chapters describing the various affec-

tions of the eye until he has thoroly mastered and mentally digested the contents of the first four chapters. The examination must be deliberate and methodical, and altho the history of the case must be patiently investigated and recorded, nothing must deter the practitioner from carrying out the usual routine examination in every detail."

The first four chapters deal with: Examination of the Eye, Urgent Cases in General Practice, Drugs in Ocular Disease, and Operations. After these the chapters take up the diseases of different parts of the eye, very much as in most textbooks. Only under "Fundus Conditions," diseases of the choroid, retina and optic nerve are all grouped together; and there is a separate chapter on "Symptomatic Disturbances of Vision," and one on "Ocular Manifestations of Nervous Disease."

All thru the work those emergencies, symptoms and problems that are likely to confront and puzzle the general practitioner are put forward in a way that will enable him to deal with them, without presupposing that he is already familiar with ophthalmology and its methods thru complete systematic studies.

The chapter on examination includes ophthalmology and retinoscopy. Among "Urgent Cases" are discussed the painful eye, redness, photophobia, sudden loss of sight, diplopia, glaucoma, loss of field, etc. Accidents are also taken up, altho there is a separate chapter on ocular injuries. The drugs referred to in the third chapter are such as boric acid, silver preparations, atropin, eserin, cocain, fluorescein and others most constantly in use in ophthalmic practice. In the chapter on operations, it is pointed out "Operations on the eye are so different from operations on other parts of the body that they require a special training, and it is quite impossible to apply to ophthalmic surgery one's knowledge of ordinary surgical operations." However, the urgent operations are pointed out; and the technic for excision of the eyeball and for removal of meibomian cyst are described as operations the general practitioner may undertake.

The color plates are much better reproductions of the appearances in question than are sometimes offered in books of this class, and will be of great assistance to those for whom the work is written. The other illustrations are good but rather sparingly employed. On the whole the book is one in which the ophthalmologist will be interested, and which he may well loan or recommend to his friends working in other branches of medicine and surgery as likely to help them without requiring too great a sacrifice of time. E. J.

Arboreal Life and the Evolution of the Human Eye. E. Treacher Collins. 108 pages, 25 illustrations, 1 colored plate. Philadelphia and New York, Lea and Febiger.

This is the revised publication of the Bowman Lecture, delivered before the Ophthalmological Society of the United Kingdom in May, 1921. The preface, which is here added to the lecture, is devoted to a brief notice of Sir William Bowman, the teacher and close friend of Donders and Graefe; and the history of the Bowman Lectures, of which this is the twenty second.

The lecture proper is divided into a five page introduction, that deals in a general way with the process of evolution and the requirements it made on the visual organ under varied conditions; and six chapters of six to twenty-six pages each. The subjects of these chapters are: The Field of Vision, Light Sense, Form Sense, Accommodation and Convergence, Color Sense and The Protective Mechanisms of the Eyeball. These headings indicate the wide scope of the subject, the author's breadth of view, and the importance that living largely in trees has had on some of the finer developments of vision in man.

This book presents, in very attractive and convenient form, facts that point out the influences under which the eye has been developed and the perfection of the mammalian eye has been attained. All the illustrations and tables are valuable, and some present in small space summaries of measurements and observations, that are very significant. Such are those relating to the relative sizes of the cornea and eyeball, or the shape and size of the crystalline lens in different animals and at different ages, and those giving other dimensions and relative

proportions. The table of references at the end of the volume opens up to the student a large amount of philosophic and zoologic literature, bearing upon the subject. As a book of reference, it lacks an index, of which it was certainly worthy. Each reader will have to construct an index for himself, a good exercise for the individual, but a repetition of labor that might have been avoided.

We can join Mr. Collins in his expression of indebtedness "to his friend, Dr. William Campbell Posey, at whose instigation and with whose kindly aid the lecture has been reproduced in its present form." E. J.

Traité Complet de Thérapeutic Oculaire Générale et Speciale. Dr. **A. Darier.** Second edition. 728 pages. Paris, Jouve et Cie, 1923.

The need for a second edition of Darier's complete treatise on ocular therapeutics, in less than two years after the publication of the first edition, indicates the eagerness of the practicing ophthalmologist to learn all he can of therapeutics, and the completeness of this work.

In the present edition nothing has been added to what was given in the first, except a preface of four pages. In the preface the author emphasizes the importance of biologic therapeutics and the colloidal remedies. Darier points out that asepsis reigns, and that the old *vis medicatrix naturae* is the principal factor in the return to health. All clinicians agree our efforts should be directed to strengthen the natural defenses of the organism.

Among remedies that have attracted attention in the last two years, autohemotherapy is mentioned as having rendered great service. This is the subcutaneous injection of some cubic centimeters of blood, drawn directly from a vein of the patient. The guiding thought in this is that antibodies form more readily in the cellular tissue than in the blood current, to combat infections and autointoxications; and that the hemolytic substances here formed assist in the removal of hemorrhagic exudates.

As to vaccines and serums in daily use, Darier says that in the last two years they have acquired a vogue that may be a little exaggerated. When available, autogenous vaccines are given the preference, but sometimes the stock vaccines must be employed. He also favors the use of polyvalent vaccines. The polyvalent vaccines, like the old "shotgun" prescription of drugs, will always enjoy a popularity connected with the indefiniteness of the diagnosis on which treatment is based. But the known occurrence of mixed infections seems to furnish a real indication for this kind of mixed treatment.

Phacoanaphylaxis comes in for notice as a real, altho rare, individual hypersensibility to lens proteins, and phacoanaphylactic endophthalmitis is recognized; but no mention is made of the important work on this subject and sensitization to uveal pigment that has been reported in America recently. This book contains so much more than Darier's earlier "Lessons on Therapeutics," that a good English translation would probably find a considerable sale. E. J.

Optical Methods in Control and Research Laboratories. J. N. Goldsmith, S. Judd Lewis and F. Twyman. Volume 1, Second Edition, 60 pages, 3 plates, 5 illustrations in text. London, Adam Hilger, Ltd.

This monograph, by three workers in science outside of medicine, is published by a firm dealing in optical instruments for scientific research, and publishers of works referring thereto. It is divided into four sections: 1. Metallurgical and Analytical Applications. 2. Absorption Spectra and Spectrophotometry. 3. The refractometer. 4. Polarimeter. As stated in the preface, this book is "intended as an introduction to the uses of the above instruments, as a guide to their selection, and as an index to further sources of information concerning their employment in control and research laboratories." Lists of the best works for the student to consult are given in the various sections.

The methods and instruments in question are coming to be very widely used in research, and in the discovery and measurements of the different elements contained in substances in commerce and

manufactures. The refractometer measures the index of refraction thru its relation to the limiting angle of total reflection. The illustrations are reproductions. Certain lines of original work in ophthalmology require knowledge of this field of optics; and the ophthalmologist—as a student of optics, may be expected to know something about them.

E. J.

Transactions of the Congress of American Physicians and Surgeons, Twelfth Triennial Session, 1922. 124 pages. Published by the Congress, Walter R. Steiner, M.D., Secretary, Hartford, Conn.

This is the smallest volume of transactions thus far issued by the Congress. More than half of it is taken up with lists of members of the constituent societies, their officers, committees, minutes and officers of the Congress. The scientific proceedings include the President's Address by Dr. Frank Billings and a series of papers on vitamins. These deal with a subject of great general interest to the medical profession, but scarcely touch upon the practical aspects of the subjects that are related to ophthalmology.

E. J.

The Riddle of the Rhine, Chemical Strategy in Peace and War, by Victor Lefebure, with preface by Marshal Foch and introduction by Sir Henry Wilson. 282 pages, 5 half-tone plates. New York: E. P. Dutton and Co. 1923.

This book first published in French in 1920, now appears in English. Its general interest is due to the intelligent account it gives of the development and possibilities of chemic warfare. Its special interest for ophthalmologists is in the allusions to "lacrimators," substances that cause temporary disability by the intense conjunctival irritation they produce. The extremely important or predominant share that chemic agencies must play in the military aggression and defence of the future, gives importance to the general understanding of the danger of war in future, and the necessity of preventing it, if civilization is to be preserved.

The author, a worker in chemic science, has a unique preparation and experience fitting him to write this book; and his technical knowledge is here set forth in most simple language, that can be understood by all.

E. J.

CORRESPONDENCE.

A Little Known Sign in Iritis.

To the Editor:—For many years I have noticed a sign in the cornea in cases of iritis which I have not found described in any textbook. I have demonstrated it to a number of colleagues, none of whom had previously noticed it. It consists in the appearance of a more or less extensive grill like figure in the cornea, comprised of straight translucent lines, lying in general in two directions at right angles to each other. This phenomenon is not visible by oblique illumination, but can be seen with the ophthalmoscope with a +16 or a +20 lens. The lines are evidently dilated lymph spaces, probably rendered conspicuous by being filled with a slightly turbid lymph. They are best seen by shifting the light from side to side. This sign is one of the early ones to appear in the development of plastic iritis and is also one of the first to disappear, thereby heralding the recovery of the eye. It can be seen to a greater or less degree in practically all cases of plastic iritis.

Respectfully,

E. C. ELLETT

Corrections.

To the Editor: In my paper *"A Study on Strabismus"* published in the American Journal of Ophthalmology for February, I note the following typographic errors: Capital "D" (diopters) instead of small "d" (distance) below the middle of column one, page 94; and near the bottom of column two page 98; "effected" for "affected" page 96, eleventh line from bottom; "reestablished" for "reestablishes," page 98, column one, line four. "A. von Graefe" should be "A. Graefe," page 101, line one; "r" is omitted from integrum, page 101, line 11;

and "separate" should be omitted at the end of line nineteen.

Paris, France. E. LANDOLT.

To the Editor: A letter from Dr. Courtney Edmond, of Clifton Forge, Virginia, has just called my attention to an error in the wording of my paper on the *cross cylinder*. The word "plus" in the third line of the second column, on page 212 of the March issue of the American Journal of Ophthalmology, should be "minus".

Denver, Colorado. WILLIAM H. CRISP.

ABSTRACTS.

Weisel, Gertrud. Hereditary Macular Disease and its Transmission. Inaugural Dissertation, Giessen.

The eyes of a child who had sustained a slight injury at play were examined, with the result that a bilateral macular change was found which obviously had nothing to do with the injury. A suspicion of an hereditary disease led to the examination of the child's brothers and sisters. Out of six children, four, one boy and three girls, were found to be similarly affected. The changes consisted in a round patch at the macula of over a disc diameter in size, yellow red to light red in color, and pigmentary changes which were usually slight and never very marked. The visual acuity was normal or only moderately lowered, and in none was a central scotoma found. Otherwise the eyes were normal, and anomalies or malformations in other organs were absent. Syphilis and tuberculosis were excluded. Both parents had normal visual acuity, as well as normal fundi.

Close inquiry into the history of the family showed it to be related to the one in which Best found a number of cases with similar appearances. Both families descended from a Johannnes J., born in 1722, who had married twice giving rise to two lines of descendants. The family described by Best came from the intermarriage of members of the fourth generation of one line, with corresponding members of the other. Eight cases of macular disease and several other ocular anomalies, as high hyperopia, convergent strabismus, and amblyopia, etc., resulted from these marriages. There was one case of the macular disease found among the children of another member of the fourth generation, of the first line of the descendants of the original Johannes J., i.e., there was no consanguinity of the parents in this one case described by Best.

The grandmother of the children under consideration was a great granddaughter of the second wife of the original Johannes J. She had six sons and two daughters by a husband who was not related to her. The macular disease was found in only the children of the two younger sons, who themselves had normal eyes as did also their wives. Consanguinity was absent here also. The older of the two is the father of the above described four children, and the younger has a daughter whose visual acuity is considerably lowered, and whose maculae show changes of the nature described. In the children of the older brothers and sisters there are none affected by the macular disease, but a number of cases of squint, high hyperopia and astigmatism were found.

Thus five cases of macular disease were found in this branch of this family, and general diseases as well as local inflammatory conditions could be excluded as causes. The age at which the process began is uncertain, because it was often present without visual disturbance. In one case a diminution of vision was noticed to have begun at 10½ years of age, but this cannot be taken as the time at which the changes just made their appearance. The lack of deepening, the absence of a central scotoma, the ophthalmoscopic appearance of the patch, the bright red color, the indistinct border, its bilaterality and occurrence in several members of the family, speak against its being of the nature of a coloboma and for its inclusion with the familial type of chorioretinitis. The chief change must have occurred in the choroid and pigment epithelium, as otherwise a reduction of vision would have been more prevalent and central scotoma would have occurred. Histologic examinations alone will tell if the process is inflammatory or purely degenerative. Since such have not been made, an incontrovertible opinion as to its nature and etiology is not possible. There

is some evidence that the disease is slowly progressive, but whether it finally becomes stationary, and whether it progresses by alternate periods of activity and quiescence, have not been determined.

If one accepts an hereditary basis for the ocular anomalies found among the different descendants of the original Johannes J., it must also be accepted that there are distinct family types. There is a distinct similarity among the defects found in brothers and sisters, but those of a not so closely related group tend to be of a more or less different nature.

The mechanism of heredity according to Mendel's Rule is briefly discussed, and it is pointed out that the transmission of the eye disorders under consideration cannot be explained on that basis. The author believes that heredity is only one factor of many, which come into play in determining the transmission and the type of ocular anomalies.

Appended is an elaborate chart of the descendants of Johannes J., showing the incidence and kind of eye defects known to have occurred.

L. L. BULL.

Berens, C. The Eye in Aviation. The Military Surgeon, Jan., 1923.

Research has been done in all the allied countries on the effects of altitude on the aviator, and the collected papers from the Medical Research Laboratory, Air Service, Mineola, give a resumé of the work in this country. The consensus of opinion is that the changes in the bodily functions at high altitudes are due mainly to the want of oxygen. In our experience the administration of oxygen prevented the onset of symptoms and restored the ocular functions to normal, even in the presence of lowered barometric pressure.

That a normal eye is of importance to the chasse pilot is appreciated by him, and 80 per cent of the fliers questioned at Issoudun gave the eye as the most valuable asset of the successful pilot. That this may be true can be readily understood, when we realize that in addition to keeping his eye on the enemy he must keep his line of flight, orient himself in relation to underlying objects, read maps, select proper landing places, make landings, operate his machine gun and watch over every detail of the plane and motor.

The safety and the proper execution of the work of a chasse pilot depend entirely upon his vision. As one approaches the lines he immediately tries to locate, in his mind, all machines and patrols in his sector. Our feeling in this country has always been that ocular physical standards for admission to the flying corps should be kept high as long as we had a sufficient number of men to choose from. All the flight leaders we saw at Issoudun were not only supposed to have exceptional vision, but actual tests showed their visual acuity to be 20/15 or 20/10. We believe that normal uncorrected vision is less important than normal muscle strength and balance, and the ability of the muscles to withstand strain.

The ideal method of maintaining the pilot's ocular efficiency would be to examine the eyes of each pilot once a month, but we were only able to care for men who were complaining. Examinations were made of 794 men who had been having difficulty in making landings, had crashed, were considered stale, or were referred to us upon discharge from the hospital before they were permitted "on the flying list." The total number of examinations, reexaminations and treatments was 1,074. Special examinations were made of 70 monitors, 8 testors, 112 fliers from the American front, 12 French fliers and 21 American Aces (8).

These men, with 442 enemy planes to their credit, had excellent uncorrected vision. In 118 cases (53.15 per cent) the vision in the right eye was 20/15 or better. In 120 cases (54.05 per cent) the vision in the left eye was 20/15 or better. Only 2.7 per cent of the number wore correction in their goggles, and those who needed correcting lenses were myopic and corrected to 20/15 or better. Every one of the men examined had normal color vision. Of the men examined, the average near point of accommodation at 20 years of age is 81.67 mm., high 90 mm., low 65 mm. At 25 years, average 104.68 mm., high 140 mm., low 80 mm.; at 30 years, average 108 mm., high 120 mm., low 100 mm.

The duction power of the ocular muscles at 6 meters and at 25 cm. should be part of the record. For practical reasons, the adduction should be tested last. In this table, at 6 meters, the average prism divergence is 5.82° and prism convergence 14.1°, fore; it seems that converging power should never be less than double the diverging power at all distances. The average near point of convergence measured from the cornea of those men whose ages averaged 26.64 years is 47.17 mm.

To determine whether the master eye gives an indication as to which side the pilot looks in landing, 12 aviators were examined. All the pilots were right handed, the right eye was the master eye in 72.72 per cent, and yet 58.1 per cent looked to the left on landing and only 24.9 per cent looked to the right. Eight and five-tenths per cent looked ahead and 8.5 per cent either side indiscriminately. The fact that the pilot was right or left handed, or that the right or left eye was the master did not give any indication of the side to which he would look in landing. All the men examined had normal stereoscopic vision, and most of them made their judgments quickly and accurately. This fact is strongly suggestive of the value of normal stereoscopic vision for the successful pilot.

Up to 10,000 feet, ocular changes noted are not constant, occasionally apparent improvement is noted, but in averaging the examinations of a number of men there was usually little change. Beginning weakness of the ocular functions is usually noted between 10,000 and 15,000 feet, and changes are nearly always more marked at 20,000 feet and over.

From our findings we believe that at lower altitudes the ocular functions may possibly be stimulated for a brief time, but at higher altitudes weakness results. The apparent improvement, occasionally noted at low altitudes, may be partly due to the difficulty in obtaining the maximum effort in the preliminary examinations. The factor of excitement in the first few minutes of a new experience may bring forth greater muscular effort, but we doubt that the early changes are due to oxygen want. At increasing altitudes, depending upon the individual, the eye ceases to function. This is secondary to cerebral or circulatory disturbances, unless a gross refractive error or muscular defect is present.

The administration of oxygen prevents the onset of changes due to altitude per se and quickly restores ocular functions to normal, even in the presence of lowered atmospheric pressure. The results obtained on the rebreathing apparatus and in the low pressure chamber are, for practical purposes, the same and the experimental findings receive confirmation in actual flying.

Ocular physical standard for pilots should be high as long as there are a sufficient number of men to select from, but findings should be carefully considered in connection with mental and physical qualifications. Altitude experimentally produced, lessens the sensitivity of the eye and weakens the ocular muscles. It would seem, therefore, that the following ocular standard for the aviator were necessary: Uncorrected vision 20/20 in each eye, and not more than two diopters of manifest hypermetropia. Normal muscle balance for distance and near with good converging and diverging power. Normal power of accommodation. Normal sensitivity to colors and light with rapid adaptation, quick visual reaction time and rapid accurate stereopsis. H. V. W.

Scheerer, R. Fulminant Amaurosis. Klin. M. f. Augenh. 1922, v. 68, p. 193.

A boy, aged 3, became totally blind within a few hours, on Oct. 15, 1921. Eyeballs without irritation, wide immovable pupils with posterior synechiae, no other signs of iritis, abundant floating opacities of vitreous, discs perhaps somewhat ill defined, retinal vessels very narrow. At the periphery of the left fundus a yellowish gray prominence. Four weeks previously he took santonin as a vermifuge. He was treated with cathartics, diaphoresis, neosalvarsan, blue ointment. On Oct 20 synechiae torn. Oct. 24 first pupillary reaction, Oct. 26 yellow prominence completely, opacities of vitreous partly, disappeared. Soon vitreous clear, incipient postneuritic atrophy, with narrow vessels. About the middle of December, normal condi-

tions and apparently normal vision. Probably these cases are due to intoxication of the optic nerve. Peculiar is the suddenness and completeness of amaurosis with often very slight objective changes; which, however, is confirmed by the complete iridoplegia. So far anatomic investigations are lacking.

C. Z.

Kruse, F. W. Keratitis Scrofulosa (Phlyctenulosa) Interstitialis. Klin. M. f. Augenh. 1922, v. 68, p. 205.

Kruse reports 2 cases. The yellowish infiltrations developed in the center or excentrically, in the deep layers of the cornea, with preservation of the epithelium, without pain. Hypopyon may be lacking and there is little irritation of the iris. Blood vessels develop, advancing from all sides, and the infiltration subsides. Development and subsidence differ entirely from the common luetic parenchymatous keratitis. The whole process may develop rapidly and also disappears rapidly. C. Z.

Morelli, E. Hypopyon Keratitis Due to Bacillus Pyocyaneus. Arch. di Ottal., 1922, v. 29, p. 285.

In the author's first case, a man of sixty-three was struck by a small piece of cement in the right eye. He showed a large white disc shaped infiltrate, including most of the lower part of the cornea, with beginning hypopyon. During twenty-four hours it advanced rapidly, but after a thoro use of the galvanocautery, progress was stopped and healing proceeded uneventfully. He retained a leucoma with vision of counting fingers at two meters.

The second case, a boy of seven, who was scratched by a finger nail, showed a similar rapidly spreading ulcer; which, however, responded equally well to the use of the actual cautery, with a thinner central leucoma than the first case. In both cases, bacillus pyocyaneus was found in profusion in both smears and cultures. The reaction for pyocyanin was obtained with the cultures, and inoculations of rabbits' corneas produced several corneal lesions from which the organisms were recovered. Subcutaneous and intraperitoneal injections were fatal to guinea pigs.

A third case recorded from the clinic records was in a woman of seventy-two, whose eye was pricked with a thorn. In this case, the cautery was not used and the ulcer went on to perforation, panophthalmitis and removal. The same organisms were recovered. The author reviews the literature, there having been about thirty-eight cases of ocular involvement reported as due to this organism. The largest number resulted in panophthalmitis, the author's results being unusually favorable, which is attributed to the early use of the cautery. The clinical features about this ulcer which seems to differentiate it from ulcers of other origin is the profuse formation of fibrinous secretion adhering to the ulcer, and a tendency to pursue a superficial course in the cornea. A table of all previous cases and bibliography of forty-three titles are included. S. R. G.

Trerotola. Marginal Ulcers of the Cornea. Ann. d'Ocul., 1921, v. 158, p. 595.

Twenty-one cases were examined, clinically and bacteriologically, in all of which the staphylococcus albus and club shaped bacillus were found.

The author's observations were: The ulcer, whatever its nature, is usually superficial, with no tendency to spread superficially or deeply. It is small, round, linear, oval or crescentic. In the latter case its concavity is towards the center of the cornea. There is a slight amount of photophobia, lacrimation, blepharospasm, conjunctival hyperemia The pain at first is constant, periorbital in location, but shortly disappears.

There is no sheath of vessels running to the lesion, but only conjunctival and circumcorneal injection. The duration varies. Prognosis is good. No opacity of the cornea remains. The lesion is unilateral and has no point of predilection. It is usually solitary, but two or more may appear, which subsequently coalesce. A series of ulcers may occupy the periphery of the cornea. Recurrences are rare. The corneal sensibility is unaffected. C. L.

Bietti. Benign Keratomycosis due to Hyphomycetes. Ann. di Ott., 1922, 50, p. 301.

The author divides cases of keratomycosis previously reported in the literature into three types, the severe ulcerative type, with hypopyon, as described by Leber, which is commonest in the literature; a pseudomembranous type, represented by only a few cases, and the benign ulcerative type, without hypopyon, first described by Uhthoff and Axenfeld. Six cases of the latter type are described. Three of these had previously been reported by his associates, and were very similar clinically. Two were due to *aspergillus fumigatus*, and the other to a variety of mucor which was called *mucor cornealis*.

The remaining three cases he saw in a period of four months. One, a girl of 18, had felt the sensation of a foreign body in the eye for two weeks. 2 mm. from the limbus was a round nodule, raised slightly above the surface of the cornea, of a yellowish color, slightly granular surface, and with a black area in the center. It showed no zone of surrounding infiltration, as had been seen in some of the other cases, but showed the characteristic sharp line of demarcation from the clear cornea around. It was removed, leaving a slight depression which healed over smoothly in two days. Cultures gave *aspergillus flavus*.

The second case was similar, except that the nodule was white, and there was more marked congestion. *Trichocladium asperum* was grown in culture. The third case showed a similar nodule, with the characteristic furrow about it, and also a zone of infiltration. *Sporodesmium punctus* was grown in cultures, and sections showed that a small piece of vegetable matter was present in the center of the growth. The *hyphomycetes* found in these cases have none of them been previously reported as occurring on the cornea.

With the author's cases, the number of cases of the benign form reported is only ten. Five of these were observed in the Siena clinic, and eight of them were diagnosed by two observers, so that the author believes they are much more common than generally supposed, and that a familiarity with their clinical picture would make the number considerably larger. S. R. G.

Lagrange. Varieties and Pathogenesis of Neuroparalytic Keratitis. Acad. de Med., Nov. 21, 1922. Abst. Gaz. des Hôp. 1922, v. 95, p. 1497.

Dangerous neuroparalytic keratitis always results from simultaneous lesion of the ophthalmic ganglion and the ophthalmic branch of Willis' nerve. A lesion of the trifacial (even resection of the Gasserian ganglion) is not sufficient to cause the disease. The cornea may become infiltrated, but the closure of the lids quickly cures the condition. The same is true when the ophthalmic ganglion alone is involved; the eye becomes soft but does not degenerate, owing to the supply of ciliary nerves from the plexus formed by the ophthalmic branch of the spinal accessory. But a lesion of both ganglion and nerve at the same time will cause the loss of the eye. C. L.

Triebenstein, O. Rosacea Affections of the Eye. Klin. M. f. Augenh. 1922. v. 68, p. 1.

Triebenstein reports on 274 cases observed within 10 years. Rosacea of the eye is not limited to advanced age; but the second and third decades also furnished a considerable percentage. One-third of the cases occurred in the male. Triebenstein elaborated a more distinct clinical picture of the different rosacea types: Blepharitis with small yellowish scabs, which never led to more serious affections of the lids. Two forms of conjunctivitis: the flatter with coils of blood vessels, and the nodular type. Rosacea keratitis consists of 3 kinds: Marginal keratitis, subepithelial infiltration and progressive. Rodent ulcer of the cornea is, in many cases, nothing but a wrongly diagnosed rosacea. A small number of cases will still remain in which an exact diagnosis is impossible. Zinc ichthyol salve abbreviates the treatment considerably, and the early curettments certainly prevent severe visual disturbances. C. Z.

Iacobellis. Pseudocyst of the Cornea. Arch. di Ottal., 1922, v. 19, p. 353.

A boy of thirteen had wounded his eye with a small knife about one year before. The eye showed a prominent swelling of the lower one-third of cornea. The eye seen above this was atrophic, with the chamber shallow. There was pain and congestion, the eye was enlarged in all its dimensions. Since vision was abolished the eye was enucleated. Then the swelling of the cornea was seen to be a cavity, 11x7x8 mm. in dimensions. The posterior wall was composed partly of corneal lamellae. But in one place those were absent, and the wall was formed by atrophic iris tissue and the remains of the shrunken lens. The anterior surface was composed of corneal lamellae except for an area at the lower part, where these were replaced by dense scar tissue. The cavity had no lining, either endothelial or epithelial.

The original wound was evidently oblique from below upwards, the point of entry being the area where the corneal lamellae were defective. Evidently the edge of the iris prolapsed into the wound and became adherent. The anterior wound closed quickly, while the posterior wound with its prolapse of iris was kept open by constant leakage of aqueous, which separated the corneal layers resulting in cyst formation. Probably the iris and corneal endothelium were in a state of poor nourishment and were unable to proliferate to line the cavity.

Five cases were found in the literature much resembling this in all particulars, except the invariable presence of a lining to the cysts. Hence the author suggests for the condition found in his case the name of pseudocyst.

S. R. G.

Aubaret and Sedan. Extension of Epithelioma of Conjunctiva to Cornea. Ann. d'Ocul., 1922, v. 159, p. 825-840.

Based upon the clinical and histologic findings in a case of epithelioma of the conjunctiva, together with the facts obtained from an extensive review of the literature from 1860 to 1920, the authors came to the following conclusions:

(a) The conjunctiva lying in the region between the lids is exposed to traumatic agents of various kinds. It, and the underlying episclera, are frequently the site of irritative and inflammatory changes.

(b) When a neoplasm arises in this region, it tends to remain localized. However, when it takes on a malignant character, there occur extensions or projections upon the cornea, or more rarely posteriorly.

(c) This neoplastic invasion is made manifest by lesions of the corneal surface, always involving the substantia propria to a greater or less degree. However, microscopic examination has shown that the cornea can be almost entirely covered by the newgrowth without involvement of the epithelium or the substantia propria.

(d) Examination of sections shows that the epithelial masses of the neoplasm are preceded by an isolating fibroconnective tissue layer, arising from the episclera, which completely separates the healthy cornea from the neoplastic area. This isolating layer protects the transparency of the cornea and permits the easy removal of the neoplasm.

C. L.

Von Berger. Alveolar Round Celled Sarcoma of the Cornea. Ann. di Ott., 1922, 50, p. 401.

A man of thirty-five had received a war wound of the left eye four years before, resulting in a large subconjunctival hemorrhage. The eye became apparently well, except for a small dark nodule at the upper outer edge of the cornea. This had increased in size, and for the past month had been causing pain and poor vision. When first seen, the nodule was the size of a kidney bean with its attachment on the upper part of the cornea and the bulbar conjunctiva, from which the mass hung over the cornea like a polyp. It was divided into two lobes, the upper one of which was brownish, the lower red and protruding at times from between the lids.

The mass was excised in toto, and there had been no recurrence during six months. Sections showed a very vascular growth, with thin walled vessels. The stroma was composed of small stellate

connective tissue cells, the parenchyma of medium sized round cells with large nuclei. Giant cells were present in all sections, containing eight to ten nuclei. These were not, however, the actively proliferating cells of a giant celled sarcoma, but the nuclei were fused and showed degenerative changes, showing a process of evolution. Much pigment was present in the upper lobule, almost none in the lower, which was believed to be the younger part of the tumor, which would probably have become pigmented at a later stage. S. R. G.

Hagen, Sigurd. Cataract Extraction, in Norway. Norsk Magazin for Laegevidenskaben, v. 84, p. 193.

Cataract extraction by the method of the elder Graefe was first done by Christen Heiberg in 1825 It did not become a popular method, Heiberg himself even abandoning it in favor of the ancient method of depression, the objection to extraction being the frequency of inflammation (infection) and resulting loss of vision. Cataract extraction came into its own, first by the introduction of antisepsis and asepsis by Hjort and Schiötz in the period of 1879 to 1890. Norwegian ophthalmology stands unique in the practice of using no bandages after extraction as a preventative of postoperative infections. This was recommended by Hjort in the 90's and with some modifications is still used.

D. L. T.

MacGillivray, Angus. Subconjunctival Cataract Extraction. British Journal of Ophthalmology, v. 6, p. 351, 1922.

The author after calling attention to the dangers of the ordinary unprotected wound in cataract extraction, discusses the various procedures set forth by Haab, Czermak, Cluckie and Bajardi. The contributor reports on upwards of three hundred operations performed in a general way similar to that of the above authors. In his early cases iridectomy was performed. Owing to the difficulty of securing a piece of iris near or at 12 o'clock this was abandoned. In this he felt justified as the risk of iris prolapse in the simple extraction is rendered negligible by the protecting conjunctival flap. The cataract knife is inserted at the temporal side 1 mm. behind the limbus and 1 mm. above the horizontal meridian. After completing the counterpuncture, the scleral incision is completed in the usual way, but without dividing the conjunctival bridge. The edge of the knife is then directed backward, separating the conjunctiva and forming a broad bridge for a distance of not less than 12 mm. After dividing the anterior capsule, the posterior lip of the wound is depressed under the conjunctival bridge, and by applying pressure over the ciliary region from below, the lens is delivered under the conjunctival bridge.

Difficulties arising during operation: If the iris falls in front of the knife proceed as if an iridectomy had been made. If a narrow palpebral aperture, the bridge is carried as far as the edge of the eyelid will permit, then the nasal point of the knife is withdrawn and the incision carried at an angle upward. If the lens does not present, draw the iris up with the vectis, allowing it to be inserted at the upper edge of the lens and thence behind it. The prolapsed iris is replaced. If the conjunctival bridge is accidently divided proceed as in a regular combined operation.

In a few cases in which a preliminary iridectomy was done, the operation was simplicity itself.

The advantages claimed for the operation are: The ease and rapidity, better protection from bacterial invasion, safety against iris prolapse, complete apposition and beautiful cosmetic and physiologic effects. D. F. H.

Valois, G. and **Lemoine, P. Lavage of the Capsule in Cataract Operations.** Ann. d'Ocul., 1923, v. 160, p. 28.

The authors refer to a previous communication (Soc. Française d'Ophtal., May, 1922) and reiterate the necessity of using a fluid as nearly as possible the same as the aqueous. In some cases they were able to bring about an immediate reforming of the anterior chamber, with its consequent advantages. In all cases, the cure seemed to be quicker, the cicatrization more prompt, there was little if any injection, and there was no postoperative pain. This latter, which

is present in almost every case where the eye is opened and more or less of its contents evacuated, is a direct consequence of the outflow of fluid, and is prevented by the artificial reforming of the anterior chamber. It is a question of decrease and restoration of the normal tension. Furthermore, it is well known that the aqueous formed after paracentesis differs in many respects from the normal aqueous, thereby producing abnormal conditions in the eye, which are prevented by restoration of the anterior chamber by a fluid similar to the normal aqueous. Thirdly: in a cataract operation, almost the entire contents of the anterior segment of the eye are removed, modifying the position of the remaining structures. Especially the iris and ciliary body lack the support of the lens, but by reforming the anterior chamber artificially, this support is in a large measure compensated for. C. L.

Whitehead, A. L. Ocular Tuberculosis. Brit. J. Ophth., v. 6, No. 12, 1922, p. 529.

The rarity of ocular tuberculosis in pulmonary or surgical manifestations is referred to. In severe wide spread destructive invasions tubercle bacilli are frequently found, while in the chronic and benign forms the infection is due to a tuberculotoxin acting on a specially prepared area. Tuberculous choroiditis, iritis and conjunctival manifestation are discussed in considerable detail. Special reference is made to a type of phlyctenulosis conjunctivitis which the author regards as definitely tuberculous. It occurs in young adults, rarely in small children, is very chronic in type and resistant to the ordinary treatment. The phlyctenules are small, closely set, aggregated together near the corneoscleral junction, and there is frequently infiltration of the cornea, with rather large invading vessels; ulceration is very rare. In some instances iritis is also present. In the use of tuberculin uniform dosage is useless. It is desirable to begin with minimal amounts gradually increased, being guided by temperature observations.

The writer's conclusions are:

1. Ocular tuberculosis is much more frequent than is usually taught.

2. Two very well defined classes of lesions exist.

(a) The destructive caseating or necrosing variety, in which the infection is primary or part of a generalized distribution of tubercle, progressive, and only slightly, or not at all, amenable to treatment. Tubercle bacilli are frequently discovered in these cases.

(b) A much milder form of infection, often called attenuated tuberculosis, probably of a toxic nature, since bacilli and giant cells are rarely found. The primary focus is usually not in the eye, and in many cases cannot be discovered by a careful investigation. The bronchial or mediastinal glands may be the focus in question.

In the second class recovery is the rule, with more or less interference with vision according to the areas of the eye affected. In the treatment of this group, properly graduated tuberculin injections are of the greatest value. In tuberculous vascular keratitis, peritomy and scarification of the invading vessels is a most valuable aid to treatment. If the primary focus is in a situation where removal can be carried out by surgical means, operation should be carefully considered. If, as seems frequently the case, the focus is in the bronchial or mesenteric glands, constitutional treatment of the most thoro treatment must be undertaken. D. F. H.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph L. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. G. McD. Van Poole, Honolulu; Dr. E. B. Cayce, Nashville, Tenn.; Dr. Gaylord C. Hall, Louisville, Ky.; Dr. Edward D. LeCompte, Salt Lake City.

DEATHS.

Dr. Adolfo Giuseppe, of Rome, died recently.

Dr. Walter Nevin Sharp, Indianapolis, aged sixty-four, died March eighth from pneumonia. He was at one time eye surgeon to the Indianapolis City Hospital, and lectured on the same subject at the Indiana Veterinary College.

Dr. Walter William Sinclair, of Ipswich, England, died early in February, 1923.

Dr. Charles Ammon Wishart, Pittsburgh, founder of the Columbia and The Eye and Ear Hospitals, aged seventy, died March fourth.

PERSONALS.

Dr. John A. Donovan, of Butte, Montana, has been elected President of the Butte Safety Council.

Dr. Albert H. Andrews has been elected Professor of Oto-Laryngology in the Chicago Eye, Ear, Nose and Throat College.

At a recent meeting of the Court of Directors of the Glasgow Eye Infirmary, Dr. Leslie Buchanan was asked to become a member of the Court.

Dr. Carl A. Hoberecht announces that he has opened an office at 626 Metropolitan Building, St. Louis, Mo., in association with Dr. John Green, Jr.

Dr. Elmer E. Brinckerhoff announces the removal of his office from the First National Bank Building to the Medical Building, Nineteenth and Franklin streets, Oakland, California.

Dr. and Mrs. C. J. Adams of Kokomo, Indiana, are in Boston. The doctor is doing postgraduate work on the eye, ear, nose and throat. May first they sail for Europe, where Dr. Adams will continue his postgraduate work.

Dr. and Mrs. Wm. E. Gamble, of Chicago, have returned from California. Mrs. Gamble was thrown from her horse, while riding in California, sustaining a fracture of the collarbone. Because of this accident, they abandoned their trip to Honolulu.

Dr. J. M. Woodson, of Temple, Texas, is erecting an eye, ear, nose and throat hospital in that city, which will be a part of the Scott and White Hospital. The building will be completed and ready for occupancy in a short time.

Dr. D. F. Harbridge, of Phoenix, Arizona, was appointed by Dr. G. E. de Schweinitz, president of the American Medical Association, as official delegate to represent that association at the inaugural of Cloyd Marvin, as president of the University at Tucson, on April 23 and 24.

Dr. Edward P. Hyde, who organized the Nela Research Laboratories in 1908, and who for the past few years has occupied the position of Director of Research of the National Lamp Works of the General Electric Company, has tendered his resignation to take effect June thirtieth of this year. Dr. Hyde, who has been active in scientific and technical affairs for a number of years, has decided to take a prolonged rest abroad. He will temporarily discontinue many of his activities in the scientific and engineering societies, but will retain his office of president of the International Commission on Illumination until its plenary meeting, which is scheduled to be held in this country in 1924.

SOCIETIES.

At the April sixteenth meeting of the New York Academy of Medicine, Dr. Alexander Duane read a paper on "Recurrent Ocular Paralysis."

The Eye and Ear Section of the Los Angeles County Medical Association has elected the following officers: President, Dr. George H. Kress; vice-president, Dr. F. L. Rogers; secretary, Dr. H. S. Muckelston.

The Houston Ophthalmological and Oto-Laryngological Society had its annual election of officers, April 3, 1923. The officers chosen were: President, Dr. E. M. Arnold; vice-president, Dr. Ray K. Daily; secretary-treasurer, Dr. William Lapat. Drs. Norma Israel, Lyle J. Logue, and P. M. Archer were re-elected as the board of censors.

The April meeting of the Chicago Ophthalmological Society, in conjunction with the Chicago Oto-Laryngological Society, took on almost the semblance of a national convention. The various clinics were all very largely attended. Forty-three attended the clinic held at the University of Illinois. At the evening session, one hundred and fifty were present at the dinner, and others came afterwards for the meeting. The out-of-town guests represented fifteen states and Canada.

The newly organized Eye, Ear, Nose and Throat Club of Rochester, New York, held its first meeting on January 8, 1923. The club adopted the informal plan of having the reader of the paper at one meeting become the chairman of the following meeting, and elected a program committee consisting of Drs. A. C. Snell, George Carroll and Herbert W. Hoyt, and Leonard W. Jones, secretary. The Rochester organization starts off with a healthy membership of twenty-five. Meetings are held on the first Monday of each month.

At the meeting of the Section on Ophthalmology, College of Physicians of Philadelphia, April nineteenth, papers were read by Dr. Burton Chance on "Sir William Bowman and the Bowman Lectures"; Dr. J. M. Thorington, by invitation, on "A Case of Simple Glaucoma," and a "Chalaziotome"; Dr. William Zentmayer, "Monocular Diplopia," Dr. E. A. Shumway, "Pulsating Exophthalmos Cured by Ligation of the Internal Carotid Artery"; Dr. Louis Lehrfeld, "Plastic Operation for Traumatic Deformities of Eyelids and Face," and "Foreign Body in the Orbit,"; Dr. Luther C. Peter, "Divergence Palsy."

The Pacific Coast Oto-Ophthalmological Society will hold its next session in Los Angeles, June twenty-first to twenty-third, inclusive. The arrangements are in the hands of the president, Dr. W. H. Roberts of Pasadena, who has appointed a committee consisting of Drs. Isaac Jones, J. MacKenzie Brown, Frank E. Detling, George H. Kress, Chester H. Bowers, and C. Benson Wood, as a committee of arrangements. The plans contemplate a business and scientific session on Thursday, the first day, with a dinner dance by the Eye and Ear Section of the Los Angeles County Medical Association in the evening. Clinics on Friday morning, papers on Friday afternoon and Saturday It is hoped that a goodly number of men who will be in attendance at the American Medical Association will arrange their itineraries to see a bit of Los Angeles and attend some of the sessions of the society.

MISCELLANEOUS.

The New York and the Manhattan Eye and Ear Hospitals of New York have been left $10,000 each by the will of Mrs. Jemina Sinclair Simms.

Two sons of a Spanish nobleman are gifted with "x-ray eyes," according to an article in the Madrid Imparcial, quoted by the Daily Mail. Tests show that the youths' abnormal vision enables them to read thru silver, brass or iron, but they cannot see thru porcelain or paper.

The board of directors of the Manhattan Eye, Ear and Throat Hospital celebrated the fifty-fourth anniversary of the founding of the institution by a dinner at the Hotel Astor, March fifteenth, and launched a $300,000 campaign for funds with which to provide additional quarters. The plan is to add three stories to the present six-story building, which will provide a total of one-hundred and sixty-five beds in wards.

The Goldwyn Picture Company has offered a reward of $5,000 to the person discovering a practical preventive for "Kleig eyes," a form of temporary blindness caused by the continued glare of the Kleig lights. "Kleig eyes" causes drying of the ball of the eye. The eyes become inflamed and blindness usually of short duration results. There are said to be one hundred and fifteen persons under treatment for "Kleig eyes" in the movie colony at the present time.

The American committee in aid of the war blinded, which is under the patronage of M. Millerand, president of the French Republic, President Wilson, and the king and queen of Belgium, is about to open shortly a large publishing house for books printed in the braille system. It is thought that the annual capacity of the plant will be around 30,000 volumes. The plates will be made of zinc and will be preserved. The work to be printed will be dictated by machines, and six or seven operators will be able to work simultaneously. The final proof pages will be read by a blind man. It has been found feasible to print the braille characters on both sides of the paper, an innovation which will permit a saving of 50 per cent. in paper, while the more extended use of abbreviations will mean a further economy of 30 per cent. Books in braille characters will thus be less bulky and more easily handled. The organizing committee estimates that it will be possible to publish a volume in less than twelve days. This publishing house will distribute gratuitously books published in the language desired to the blind soldiers of France and allied countries. It will also furnish to the civilian blind any surplus of books not needed by the war blinded. It will publish a journal in braille characters, and plans also to get out reading courses.

Current Literature

These are the titles of papers bearing on ophthalmology. They are given in English, some modified to indicate more clearly their subjects. They are grouped under appropriate heads, and in each group arranged alphabetically, usually by the author's name in **heavy-face type.** The abbreviations mean: (Ill.) illustrated; (Pl.) plates; (Col. Pl.) colored plates. Abst. shows it is an abstract of the original article. (Bibl.) means bibliography and (Dis.) discussion published with a paper. Under repeated titles are given additional references to papers already noticed. To secure early mention, copies of papers or reprints should be sent to American Journal of Ophthalmology, 217 Imperial Building, Denver, Colorado.

BOOKS.

Bielschowsky, A. Repetitorium der Augenheilkunde. Leipzig, J. A. Barth, 1922. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 8, p. 517.

Deutsch. ophthalmologischen Gesellschaft. Bericht ueber die 43 Versammlung in Jena, 1922. 346 pages, 74 illustrations, 1922. A. J. O., 1923, v. 6, p. 336.

Diagnostic and therapeutic errors in ophthalmology. Edited by Dr. J. Schwalbe. Part 4 of Ophthalmic Section by Dr. Bielschowsky. 66 pages, 40 illustrations. Leipzig, George Thieme, 1922. Lancet, 1923, March 31, p. 656.

Elliot, R. H. Treatise on glaucoma. Second Edition. Oxford Medical Publications. Indian Med. Gaz., 1923, v. 58, p. 140.

Fuchs, E. Textbook of ophthalmology. Authorized translation of the twelfth German edition. Numerous additions and much enlarged by Alexander Duane, 455 illustrations. Philadelphia and London, J. B. Lippincott Co. Atlantic Med. Jour., 1923, v. 26, p. 495.

Gilbert, W. Diseases of uveal tract. Handbuch der ges. Augenheilkunde. Berlin, Julius Springer, 1922. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 169.

Goldnamer, W. W. The anatomy of the human eye and orbit. 224 pages, 65 illustrations. Chicago, Professional Press, 1923.

Goldsmith, J. N., Lewis, S. J. and Twyman, F. Optical methods in control and research laboratories. Second edition. Adam Hilger, 75a Camden Rd., London, N. W. 1, England, 1923. Atlantic Med. Jour., 1923, v. 26, p. 496.

Lagrange, F. Glaucome et hypotonie. 432 pages, 104 illustrations, 6 color plates. O. Doin, Paris, 1922. A. J. O., 1923, v. 6, p. 334.

Nela Research Laboratory. Abstract-Bulletin, v. 1, No. 3, Pages 1-1X, 303-521, 12 plates, 60 illustrations. Research Dept., National Lamp Works of General Electric Co., Cleveland, 1922. A. J. O. 1923, v. 6, p. 335.

Stilling's Pseudo-Isochromatische Tafeln zur Pruefung des Farbensinnes. Herausgegeben von Prof. Dr. E. Hertel. 5 pages, 29 color plates. Leipzig, George Thieme, 1922. A. J. O., 1923, v. 6, p. 337.

Transactions Ophthalmological Society of United Kingdom, v. 42, 1922. 462 pages, 10 plates, 18 illustrations, London, J. and H. Churchill. A. J. O., 1923, v. 6, p. 336.

DIAGNOSIS.

Ascher. Tonometry and atmospheric pressure. Klin. M. f. Augenh., 1922, v. 69, p. 525.

Behr. Intermediate visual fields. Deut. ophth. Gesell in Jena, 1922, pp. 216-219.

Bodenheimer. Maximum tonometer. Klin. M. f. Augenh., 1922, v. 69, p. 850.

Comberg. Pressure Tonometer. Klin. M. f. Augenh., 1922, v. 69, p. 848.

Downey, J. W. Self registering campimeter and scotometer. (3 ill.) A. J. O., 1923, v. 6, pp. 281-284.

Greeff. Standard tonometer. Klin. M. f. Augenh., 1922, v. 69, p. 849.

Gullstrand. Demonstration of diaphragm lamp. Deut. ophth. Gesell., Jena, 1922, p. 290.

Henker, O. Accessory refractometer to Gullstrand's large simple ophthalmoscope. (7 ill.) Deut. ophth. Gesell. in Jena, 1922, p. 87.

Lenz. Stereocamera for photography of anterior segment of eye. Deut. ophth. Gesell. in Jena, 1922, p. 290.

Lo Cascio. Position of optic nerve entrance and perimetry. (5 ill.) Ann. di Ottal. e Clin. Ocul., 1922, v. 50, p. 607-621.

Löwenstein, A. Manometric measurement in mammals. Deut. ophth. Gesell. in Jena, 1922, pp. 41-43.

Pieron, H. Differential photoptometer with many uses. Anneé Psychol., 1922, v. 22, pp. 229-233. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 137.

Thibaudet, E. Simulated bilateral amblyopia. (13 ill.) Arch. d'Opht., 1923, v. 40, p. 105-112.

Thorner, W. New far point test. Deut. ophth. Gesell. in Jena, 1922, pp. 75-77.

Trettenero, A. Microscopy of living eye with Gullstrand lamp. Ann. di Ottal. e Clin. Ocul., 1923, v. 51, p. 80-87.

Trömner, E. Corneo-pterygoid reflex. Zeit. f. d. ges. Neur. u. Psychiat., 1922, v. 78, pp. 306-309. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 44.

Zbikowski. Diagnosis from microscopic examination of human eye. (40 ill.) Arch. de Oft. Hisp.-Amer., 1923, v. 23, pp. 99-118.

Vogt, A. New kinesiometer. (dis.) Soc. des Ocul. Suisses, 1922, June. Abst. Rev. Gén. d'Opht., 1922, v. 36, p. 308.

THERAPEUTICS.

Birch-Hirschfeld. Radiotherapy in eye diseases. (dis.) Klin. M. f. Augenh., 1922, v. 69, p. 523.

Cords. Injections of milk in ocular therapeutics. Klin. Woch., 1923, Jan. 22. Abst. Clin. Opht., 1923, v. 27, pp. 80-87.

Huber, R. Results of tuberculin therapy. Szemeszet., 1922, v. 56, pp. 17-19. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 320.

Igersheimer. Electric current in ocular diseases. Klin. M. f. Augenh., 1922, v. 68, p. 395.

Japiot, P. and Bussy, L. Roentgen therapy in inflammatory diseases of eye. Paris Méd., 1923, v. 13, p. 126. Abst. Intern. Sur. Ophth., 1923, v. 5, p. 154.

Lucanus. Therapeutic experiences. Klin. M. f. Augenh., 1922, v. 69, p. 846.

Passow, A. Thermocautery. Deut. ophth. Gesell. in Jena, 1922, p. 296.

Perez Bufill. Intramuscular injections of milk for ocular diseases. Arch. de Oft. Hisp.-Amer., 1923, v. 23, pp. 142-166.

Rindfleisch. Ponndorf's cutaneous inoculation treatment. Deut. ophth. Gesell. in Jena, 1922, pp. 68-71.

Marchi, L. Anaphylaxis in ocular diseases. La Speranza, 1921. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 520.

Rötth, A. v. Novatropin in eye diseases. Klin. M. f. Augenh, 1922, v. 69, p. 854.

Rovirosa. Immunity in ophthalmology. Clin. Opht., 1923, v. 27, pp. 74-80.

Schanz, F. Treatment of eye diseases with light. Deut. ophth. Gesell. in Jena, 1922, pp. 229-233.

Seidel, E. Pharmacology of eyes. (1 ill.) Deut. ophth. Gesell. in Jena, 1922, pp. 48-57.

Sievert, H. Dyodyl-Riedel treatment of eyes. Med. Klin. 1922, v. 18, p. 1412. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 146.

Repeated title. **Mazzei.** (A. J. O., 1923, v. 6, p. 344). Intern. Sur. Ophth., 1923, v. 5, p. 183.

OPERATIONS.

Cole, W. H. Skin grafting experiments. Jour. Exper. Zool., 1922, v. 35, pp. 353-419.

Cramer. Knut's fixation forceps. Klin. M. f. Augenh., 1922, v. 69, p. 845.

Eliasberg, M. Eye bandage. Klin. M. f. Augenh., 1922, v. 69, p. 515.

Hessberg, R. Rustfree lid hook. Krupp Steel, V. 2, A., (5 ill.) Klin. M. f. Augenh., 1922, v. 69, pp. 757-759.

Zur Nedden, M. Lance canula for withdrawal of vitreous humor. (1 ill.) Klin. M. f. Augenh., 1922, v. 69, pp. 514-515.

PHYSIOLOGIC OPTICS.

Aubel, H. Quantitative ocular fatigue measured by psychic eye test. Zeit. f. Hyg. u. Infektionsk., 1922, v. 96, pp. 317-336. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 35.

Bappert, J. Relation of accommodation and convergence to perception of depth. Zeit. f. Psychol. d. Sinnesorg., 1922, v. 90, pp. 167-203. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 187.

Filehne, W. Apparent space of heavens. Zeit. f. Psychol. u. Physiol. d. Sinnesorg., 1922, v. 54, pp. 1-8. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 499.

Gallerani. Studies of spectrum. Ann. di Ottal. e Clin. Ocul., 1922, v. 50, p. 712.

Gelhorn, E. Relative impressions. Deut. ophth. Gesell. in Jena, 1922, p. 74.

Granit, A. R. Perception of form. Brit. Jour. of Psychol. Gen. sec., 1921, v. 12, pp. 223-247.

Hillebrand, F. Stroboscopic vision. Zeit. f. Psychol. u. Physiol. d. Sinnesorg. v. 89, pp. 209-272; v. 90, pp. 1-66. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 185.

Hofmann, F. B. Absolute optical localization. Klin. M. f. Augenh., 1922, v. 69, p. 522.

Kiesow, F. Metallic luster in stereoscopic vision. Arch. f. d. ges. Psychol., 1922, v. 43, pp. 1-10. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 498.

Koeppe, L. Problem of curvature of elastic membranes of living cornea and lens. Deut. opt. Woch., 1922, v. 8, pp. 672-676. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 189.

Histologic basis of Siedentopf's intraocular cone of light. (2 ill.) Deut. ophth. Gesell. in Jena, 1922, pp. 80-82.

Kuroda, G. Measurement of binocular space threshold of mosaic vision. Acta Scholae Med. Univ. Imperial, Kioto, v. 5, 1921, pp. 43-48. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 181.

Nakamura, B. Source of light and light phenomenon. (1 ill.) Klin. M. f. Augenh., 1922, v. 69, pp. 806-815.

Kohlrausch. Color photometry. Klin. M. f. Augenh., 1922, v. 69, p. 522.

Rothschild, H. Zollner's fragmentary images. Zeit. f. Psychol., 1922, v. 90, p. 137. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 136.

Ryer, E. L. Source of error in subjective optometry. (4 figs.) Arch. of Optometry, 1923, v. 2, pp. 99-102.

Schumann, F. Dimension of visual space. Zeit, f. Psychol. u. Physiol. d. Sinnesorg., 1922, v. 86, pp. 253-277. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 34.

Shoji, Y. Absorption of ultraviolet rays thru ocular media. Mitt. a. d. Med. Fak. d. Kais. Univer., 1922, v. 29, pp 61-129. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 268.

Siedentopf, H. An intraocular subjective light figure. Deut. ophth. Gesell. in Jena, 1922, p. 78.

Whitwell, A. Crossing of rays produced by refraction of prism. Optician, 1922, v. 63, pp. 399-402.

Repeated titles. **Dor.** (A. J. O., 1922, v. 5, p. 690) Brit. Jour. Ophth., 1923, v. 7, p. 196. **Sachs.** (A. J. O. 1922, v. 5, p. 162) A. J. O., 1923, v. 6, p. 341.

REFRACTION.

Arizawa, U. Anisometropia. Jahres. d. japan. ophth. Ges. Kyoto, 1922. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 191.

Aronsfeld, G. H. Refractive changes due to diabetes. Arch. of Optometry, 1923, v. 2, pp. 66-70.

Belehradek, J. Astigmatism produced by fatigue of ciliary muscle. Arch. Int. de Physiol., 1922, v. 20, pp. 52-61. Abst. Zent. f. d. ges. Ophth., 1923, v. 9, p. 193.

Best, F. Correlation in development of eyes. Deut. ophth. Gesell. in Jena, 1922, pp. 202-204.

Brückner, A. Graphic methods for spectacles. Deut. ophth. Gesell. in Jena, 1922, p. 97.

Cavara, V. Inversion of astigmatism. Boll. d'Ocul., 1922, v. 1, pp. 301-334. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 437.

Elschnig, A. Changes of refraction in diabetes. Med. Klin., 1923, v. 19, p. 17. Abst. J. A. M. A., 1923, v. 80, p. 968.

Folsom, L. P. Effects of age on visual acuity and pupillary size. Arch. of Optometry, 1923, v. 2, pp. 71-74.

Guglianetti, L. Measurement of accommodation. (8 ill.) Arch. di Ottal., 1923, v. 30, pp. 25-47.

Hegner, C. A. Accommodation in ametropic eyes with glasses. Scheiz. med. Woch., 1923, v. 53, p. 53. Abst. J. A. M. A., 1923, v. 80, p. 1032.

Jess. Tonic accommodation. Klin. M. f. Augenh., 1922, v. 69, p. 837.

Mendoza, R. Skiascopy. España Oft., 1922, v. 7, pp. 162-166.

Münch. Anisometropia in twins. (2 ill.) Deut. ophth. Gesell. in Jena, 1922, pp. 241-245.

Munoz Urra, F. Structure and physiology of ciliary muscle in man, mammals, and birds. (4 ill.) Arch. de Oft. Hisp.-Amer., 1923, v. 23, pp. 33-42.

Newman, E. A. R. Berger's stereoscopic lenses for ophthalmic practice. (4 ill.) Indian Med. Gaz., 1923, v. 58, pp. 107-109.

Pascal. Prescribing of prisms. Optician, 1922, v. 64, pp. 21-23.

Roberts, W. H. Increase of hyperopia in diabetes. (bibl.) A. J. O., 1923, v. 6, pp. 291-295.

Rohr, M. v. Older studies on fitting glasses to both eyes. Deut. ophth. Gesell. in Jena, 1922, pp. 93-97.

Sedan, J. Accommodative asthenopia with rheumatism. Marseille Méd., 1922, v. 59, pp. 737-740. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 511.

Sheard, C. Prescribing of prisms. Optician, 1922, v. 64, pp. 3-8.
Ocular refraction. Arch. of Optometry, 1923, v. 2, pp. 53-65.

Southall, J. P. C. Path of ray thru prism. Optician, 1922, v. 64, p. 207.

Stähli, J. Pathogenesis of astigmatism. Klin. M. f. Augenh., 1922, v. 68, p. 124.

Stearns, W. G. Cycloplegia in girl of twelve. (dis.) Arch. of Neur. and Psych., 1923, v. 9, p. 532.

Stirling, A. W. Astigmatism with reference to influence of age on axis. Optician, 1922, v. 64, pp. 131-134.

Weiss, E. Prismatic effects of spectacle glasses. (5 ill.) Deut. ophth. Gesell. in Jena, 1922, pp. 101-106.

Whitwell, A. Improved refractograph. Optician, 1922, v. 63, pp. 359-361.

Repeated title. **Amsler.** (O. L., 1921, v. 17, p. 259.) Brit. Jour. Ophth., 1923, v. 7, p. 199.

OCULAR MOVEMENTS.

Bárány, R. Lateral turning of eye. Acta Oto-Laryng., 1922, v. 4, pp. 94-95. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 36.

Bartels. Abducens, trochlearis and oculomotor nerve apart from eye movements. Deut. ophth. Gesell. in Jena, 1922, pp. 6-8.

Bielschowsky, A. Convergent strabismus in myopia. Deut. ophth. Gesell. in Jena, 1922, pp. 245-248.
Kremer's operation of trochlearis pareses. (14 ill.) Klin. M. f. Augenh., 1922, v. 69, pp. 611-620. Abst. Internat. Sur. Ophth., 1923, v. 5, p. 108.

Blatt, N. Abduction phenomena. Klin. M. f. Augenh., 1922, v. 69, pp. 735-743.

Bretagne. Ophthalmoplegic migraine. Rev. Méd. de l'Est, 1922, v. 50, pp. 419 and 422. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 43.

Brown, T. G. Reflex orientation of optical axes. Arch. Néerland de Physiol. de l'Homme et des Anim. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 159.

Capra, L. Syndrome of Marcus Gunn. Boll. d'Ocul., 1922, pp. 192-213. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 451.

Cords, E. Loss of muscle function. Zeit. f. Anat. u. Entwickl., 1922, v. 65, pp. 254-276. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 132.

Cords, R. Convergent strabismus sursoadductorius. (4 ill.) Deut. ophth. Gesell. in Jena, 1922, pp. 158-160.

Czellitzer, A. Congenital strabismus. Klin. M. f. Augenh., 1922, v. 69, p. 519.

Fleisch, A. Tonic labyrinth reflex and position of eyes. Pflüger's Arch. f. d. ges. Phys., 1922, v. 194, p. 554. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 324.

Francais, H. and Magnol, C. Parinaud's syndrome with polyuria. Soc. de Neur., 1923, March. Abst. Gaz. des Hôp., 1923, v. 96, p. 369.

John, and Stockebrand. Epidemic bulbar paralysis. Münch. med. Woch., 1922, v. 69, p. 1544-1547. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 214.

Koellner, H. Ocular movements. Klin. Woch., 1923, v. 2, p. 482-484.

Koellner, H. and Hoffmann, P. Vestibular innervation of ocular muscles. Deut. ophth. Gesell. in Jena, 1922, pp. 155-157.

Kremer, R. Operative treatment of trochlearis pareses. (1 ill.) Klin. M. f. Augenh., 1922, v. 69, pp. 600-611. Abst. Internat. Sur. Ophth., 1923, v. 5, p. 107.

Marquez, M. Spasm of ocular muscles and diplopia. (13 ill. bibl.) Arch. de Oft. Hisp.-Amer., 1923, v. 23, pp. 1-21.

Masuda, T. Physiology of rotatory nystagmus. Arch. f. d. ges. Physiol., 1922, v. 197, p. 1. Abst. Internat. Sur. Ophth., 1923, v. 5, p. 155.

Mügge, F. Objective measurement of high strabismus. (1 ill.) Deut. ophth. Gesell. in Jena, 1922, pp. 161-165.

Munoz Urra, F. Embryonic development of fourth nerve. (9 ill. bibl.) Arch. de Oft. Hisp.-Amer., 1923, v. 23, pp. 84-99.

Devlopment of ocular muscles after birth. Arch. de Oft. Hisp.-Amer., 1923, v. 23, pp. 133-142.

Nasiell, V. Nystagmus with fixation and convergence. Int. Zent. f. Ohrenh., 1922, v. 20, pp. 2-4. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 325.

Nylen, C. O. Nystagmus phenomenon. Acta Oto-Laryngol., 1922, v. 3, pp. 502-503. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 277.

Oeckinghaus, W. Rare disturbance of ocular muscles of nuclear origin. Klin. Woch., 1922, v. 1, p. 2116. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p 161.

Ohm, J. Effect of narcosis nystagmus of young. Klin. M. f. Augenh., 1922, v. 69, pp. 385-393.

Nystagmus. (1 ill.) Deut. ophth. Gesell. in Jena, 1922, pp. 219-222.

Papillon, P. H. and Lestoquoy, C. Congenital family nystagmus with albinism. Bull. de la Soc. de Pediat., 1922, pp. 128-130. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 327.

Paulian, E. D. Family infantile bulbar paralysis. Rev. Neurol., 1922, v. 29, pp. 275-278.

Peppmüller. Chronic ophthalmoplegia externa. Klin. M. f. Augenh., 1922, v. 68, p. 830.

Peters. Hereditary strabismus. Klin. M. f. Augenh., 1922, v. 68, p. 392.

Sodani, S. Rotation of eyeball in Japanese. Jahresvers. d. japan ophth. Ges., 1922, v. 4, No. 2 and 3. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 160.

Stock. New phorometer. (3 ill.) Deut. ophth. Gesell. in Jena, 1922, p. 291.

Strader, G. L. Oculomotor paralysis. (dis.) A. J. O., 1923, v. 6, pp. 299-300.

Van der Hoeve, J. Action of eye muscles in squint. (11 ill.) Klin. M. f., Augenh., 1922, v. 69, p. 620-642. Abst. Internat. Sur. Ophth. 1923, v. 5, p. 106.

Repeated title. **Rateau.** (A. J. O., 1923, v. 6, p. 345.) Internat. Sur. Ophth., 1923, v. 5, p. 109.

CONJUNCTIVA.

Aitoff, M. Anthrax of conjunctiva. Ann. de l'Inst. Pasteur, 1922, v. 36, pp. 567-573. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 406.

Cavara, V. Pseudotuberculosis of conjunctiva. Boll. d'Ocul., 1922, p. 123-134. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 335.

Pseudotuberculosis and Parinaud's conjunctivitis. Boll. d'Ocul., 1922, v. 1, pp. 48-65. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 539.

Bane, W. C. and W. M. Trachoma pannus. (dis.) A. J. O., 1923, v. 6, p. 298.

Clausen, W. Clinic on pemphigus of conjunctiva. Deut. ophth. Gesell. in Jena, 1922, pp. 251-256.

Cochard, M. Radiotherapy in trachoma. Lyon thesis, 1921. Abst. Arch. d'Opht., 1923, v. 40, p. 125.

Csapody, I. v. Hyalin degeneration of bulbar conjunctiva. Szemeszet., 1922, v. 56, p. 15. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 223.

Dahmann, F. Epidemic of Koch-Weeks conjunctivitis in Köln, 1920. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 219.

Eaton, F. B. Intermediary hosts, tabanidae and bed bugs in trachoma. A. J. O., 1923, v. 6, pp. 339-340.

Erben, W. Milk injections for gonorrheic conjunctivitis in new born. Klin. M. f. Augenh., 1922, v. 69, pp. 471-475.

Fialho, A. Operation for pterygium. Brazil Med., 1923, v. 37, pp. 129-131.

Fort, A. G. Vernal conjunctivitis. Jour. Med. Assoc. Georgia, 1923, v. 12, pp. 101-103.

Gebb. Pemphigus of conjunctiva. Klin. M. f. Augenh., 1922, v. 69, p. 838.

Genck, G. Xerophthalmia in children. Monats. f. Kinderh., 1922, v. 24, p. 251.

Hayashi, Y. Xerophthalmia in rabbit. Tohoku Jour. Exper. Med., 1922, v. 3, pp. 107-119. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 370.

Hessberg, R. Deycke-Much treatment of eczematous eye disease. Zeit. f. Augenh. 1923, v. 49, pp. 327-335.

Holm, E. Xerophthalmia in rat. Bibliotek f. Laeger, 1922, v. 114, pp. 221-224. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 529.

Kapuscinski, W. Trachoma. Abh. d. med. Akad. Warschau, 1921, I, pp. 148-203. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 334.

Kashiwai, C. Follicles in spring catarrh. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 221.

Meyer. Vaccinola of conjunctiva. Zeit. f. Med. 1922, v. 35, pp. 494-498. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 222.

Myers, F. C. Trachoma among Ute Indians. Northwest Med., 1923, v. 22, p. 138.

Nowak, E. Tubercular phlyctenular conjunctivitis. Deut. ophth. Gesell. in Jena, 1922, pp. 117-128.

Pascheff, B. Follicular and epithelial cystic formations in spring catarrh. Klin. M. f. Augenh., 1922, v. 69, pp. 460-464. Deut. ophth. Gesell. in Jena, 1922, pp. 273-276.

Sallmann. Radium treatment of trachoma. Klin. M. f. Augenh., 1922, v. 69, p. 852.

Schall, E. Gonorrheic abscess of lid and meningitis. Klin. M. f. Augenh., 1922, v. 69, p. 597-600.

Schneider, R. Ocular disease from Koch-Weeks bacillus. Deut. ophth. Gesell. in Jena, 1922, pp. 234-238.

Seefelder. Inflammation of conjunctiva in six month fetus. Klin. M. f. Augenh., 1922, v. 69, p. 525.

Stajduhar, J. and Derdac, V. Etiology of trachoma. Klin. M. f. Augenh., 1922, v. 69, pp. 663-666.

Steiner, L. Constitution and trachoma. Klin. M. f. Augenh., 1922, v. 69, pp. 662-663. Abst. Internat. Sur. Ophth., 1923, v. 5, p. 118.

Stockard, C. Pemphigus of conjunctiva. Jour. Med. Assn. of Georgia, 1923, v 12, pp. 95-97.

Szokolik, E. Canthotomy for corneal complications in gonorrheal conjunctivitis. Klin. M. f. Augenh., 1922, v. 69, p. 660-662. Abst. Internat. Sur. Ophth., 1923, v. 5, p. 114.

Wakizaka, K. Acute trachoma. Abst. Japan Med. World, 1923, v. 3, p. 33.

Wiegmann. Tuberculoids of conjunctiva of globe. Klin. M. f. Augenh. 1922, v. 68, p. 395.

Wright, J. W. Solarization in trachoma. A. J. O., 1923, v. 6, p. 279-280.

Zannoni, C. Trachoma in Firenze. Ann. di Ottal. e Clin. Ocul., 1922, v. 50, p. 714.

Repeated titles. **Allisson.** (A. J. O., 1922, v. 5, p. 773.) Brit. Jour. Ophth., 1923, v. 7, p. 191. **Dor and Fouassier.** (A. J. O., 1922, v. 5, p. 597.) Brit. Jour. Ophth., 1923, v. 7, p. 189. **Li.** (A. J. O., 1922, v. 5, p. 935.) A. J. O., 1923, v. 6, p. 340. **Trumpy.** (A. J. O., 1923, v. 6, p. 346.) J. A. M. A., 1923, v. 80, p. 812.

CORNEA AND SCLERA.

Ascher, K. W. Histology of keratoplastics. Deut. ophth. Gesell. in Jena, 1922, pp. 198-200.

Asmus. Treatment of corneal herpes with zinc iontophoresis. Klin. M. f. Augenh., 1922, v. 68, p. 388.

Avizonis, P. Blue sclera. Medicina, 1921, v. 2, pp. 151-153. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 153.

Bader, A. Herpes following corneal injury. (dis.) Soc. des Ocul. Suisses, 1922, June. Abst. Rev. Gén. d'Opht., 1922, v. 36, p. 315. Klin. M. f. Augenh., 1922, v. 68, p. 123.

Bane, W. C. and W. M. Unusual form of keratitis. (dis.) A. J. O., 1923, v. 6, p. 299.

Boucek, B. Influence of strychnin on corneal reflex. Biol. listy., 1921, v. 8, pp. 1-17. Abst. Zent. f. d. ges. ophth. u. i. Grenz., 1922, v. 8, p. 381.

Creighton, W. J. Herpes zoster ophthalmicus. (dis.) A. J. O., 1923, v. 6, p. 311.

Crisp, W. H. Dendritic keratitis. A. J. O., 1923, v. 6, p. 301.

Denti, A. V. Postinfluenzal dendritic keratitis. Osp. Magg., 1922, v. 10, p. 183. Abst. Zent. f. d. ges. ophth. u. i. Grenz., 1922, v. 8, p. 382.

Rodent ulcer of cornea associated with Claude Bernard-Horner syndrome. (1 col. pl. bibl.) Ann. di Ottal. e Clin. Ocul., 1923, v. 5, pp. 72-78.

Erggelet. Microscopic section of cornea with salvarsan dermatitis. Deut. ophth. Gesell. in Jena, 1922, p. 301.

Measurement of keratoconus. (2 ill.) Deut. ophth. Gesell. in Jena, 1922, pp. 106-107.

Friede, R. Microcornea. (15 ill.) Klin. M. f. Augenh., 1922, v. 69, pp., 561-583. Abst. Internat. Sur. Ophth., 1923, v. 5, p. 122.

Goldschmidt. Origin and treatment of keratomalacia. Klin. M. Augenh., 1922, p. 525.

Grunert, K. Paracentesis. (1 ill. dis.) Deut. ophth. Gesell. in Jena, 1922, pp. 178-191.

Grüter, W. Corneal herpes. Deut. ophth. Gesell. in Jena, 1922, pp. 227-229. Etiology and therapy of keratitis disciformis. Klin. M. f. Augenh., 1922, v. 69, p. 840.

Hauptvogel, J. Band formation in corneal opacity. Klin. M. f. Augenh., 1922, v. 69, pp. 763-769.

Hoffman, J. N. Monocular interstitial keratitis. A. J. O., 1923, v. 6, pp. 296-297.

Imai, R. Blue sclera and brittle bones. Jahresvers. d. japan. ophth. Ges., 1922, v. 4, No. 2 and 3. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 153.

Imre, J. v. Keratoconus. Szemeszet, 1922, v. 56, pp. 6-7. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 229.

Isaicu, L. and Liviu, T. Experimental corneal herpes with grippe. Clujul Med., 1922, v. 3, pp. 167-171. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 543.

Igersheimer, J. Experimental tuberculosis of cornea. Klin. M. f. Augenh., 1922, v. 69, pp. 486-496.

Jean, G. W. Keratoconus. A. J. O., 1923, v. 6, p. 297.

Jendralski, F. Fleischer's ring with Wilson's disease. (2 ill.) Klin. M. f. Augenh., 1922, v. 69, pp. 750-754.

Kling, C. H. D. and Liljenquist, F. Affinity of cornea to encephalitic virus. Compt. rend. des Sc. de la Soc. Biol. 1922, v. 87, p. 486-488. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 468.

Knüsel, O. Histology of cornea and conjunctiva studied by vital staining. Klin. M. f. Augenh. 1922, v. 68, p. 125.

Kraupa. Fleischer's greenish discoloration cornea. Klin. M. f. Augenh., 1922, v. 69, p. 526.

Keratoconus. Deut. ophth. Gesell. in Jena, 1922, p. 294.

Lutz, A. Conjunctival corneal reflexes with hemianesthesia. (3 ill.) Klin. M. f. Augenh., 1922, v. 69, pp. 475-482.

Metzger. Fleischer's rings in hepatolenticular degeneration. Klin. M. f. Augenh., 1922. v. 69, p. 838.

Munoz Urra. Ophthalmic ganglion in lesions of anterior part of eye. (4 ill. bibl.) Arch. de Oft. Hisp.-Amer., 1923, v. 23, pp. 65-84.

Intracellular structure of Golgi, after injury to cornea and retina. Arch. de Oft. Hisp.-Amer. (9 ill. bibl.) 1923, v. 23, pp. 21-32.

Nakamura, B. Cytology of mycotic ulcerous keratitis. Klin. M. f. Augenh., 1922, v. 69, pp. 669-673. Abst. Internat. Sur. Ophth. 1923, v. 5, p. 123.

Peters. Treatment of marginal ulcer of cornea. Klin. M. f. Augenh., 1922, v. 68, p. 391.

Pillat. A. Lattice like formation in degeneration of cornea. (5 ill.) Zeit. f. Augenh., 1923, v. 49, pp. 313-327.

Rasmussen, C. Parenchymatous keratitis. Hospitalstid., 1922, v. 65, pp. 49-57. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 544.

Römer. Scrofulous keratoconjunctivitis with tuberculosis. Klin. M. f. Augenh., 1922, v. 68, p. 128.

Rosenberg. Ophthalmoreaction in bilateral tuberculous interstitial keratitis. Klin. M. f. Augenh., 1922, v. 69, p. 849.

Rötth, A. Unilateral trachoma. Szemeszet., 1922, v. 56, p. 7. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 219.

Sandmann. Scleral mestastases at limbus. Klin. M. f. Augenh., 1922, v. 69, p. 842.

Schnaudigel, O. Therapy of keratoconus. (2 ill.) Klin. M. f. Augenh., 1922, v. 69, pp. 466-471.

Sondermann, R. Trephining serpent ulcer of cornea. Klin. M. f. Augenh., 1922, v. 69, pp. 759-763.

Stieren, E. Neuroparalytic keratitis. Enucleation without anesthesia. Atlantic Med. Jour., 1923, v. 26, p. 467.

Urbanek. Treatment of corneal degeneration. Klin. M. f. Augenh., 1922, v. 69, p. 851.

Vossius. Parenchymatous keratitis. Klin. M. f. Augenh., 1922, v. 69, p. 839.

Watanabe, M. Keratosis of cornea and conjunctiva. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 222.

Weihmann. Corneal ulcer treated with transparent shield without bandage. Klin. M. f. Augenh., 1922, v. 69, p. 848.

Williams, C. B. Corneal ulcer cured by tonsillectomy. J. A. M. A., 1923, v. 80, p. 917.

Wood, H. Scleral ectasia. (4 ill.) A. J. O., 1923, v. 6, pp. 314-316.

Zaviska, P. Parenchymatous keratitis. Bratislavske lekarske, 1922, v. 1, pp. 295-305. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 227.

Repeated titles. **Iacobellis.** (A. J. O., 1923, v. 6, p. 346.) Internat. Sur. Ophth., 1923, v. 5, p. 171. **Majewski.** (O. L., 1921, v. 17, p. 262) Brit. Jour. Ophth., 1923, v. 7, p. 194.

ANTERIOR CHAMBER AND PUPIL.

Alexander, W. Loss of pupil reflex in epilepsy. Med. Klin., 1922, v. 18, p. 831. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 420.

Botzian, A. Traumatic Argyll Robertson pupil. Klin. Woch., 1923, v. 2, p. 82.

Fracassi, G. Persistent bilateral pupillary membrane. Boll. d'Ocul., 1922, pp. 262-283. Abst. Zent. f. d. ges. Ophth. u. i. Grenz, 1922, v. 8, p. 414.

Gesualdo, G. Paradoxic pupil reaction. Riv. Ital. di Neurop. Psichiatr., 1922, v. 15, pp. 60-67. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 511.

Goldflam, S. Voluntary pupil movements. Klin. M. f. Augenh., 1922, v. 69, pp. 407-429.

Kofman and Bujadous. Pupil motor reflex. Compt. rend, d. Sc. de la Soc. Biol., 1922, v. 86, p. 1165. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 324.

Kramer. Pupil reaction in abduction. Deut. med. Woch., 1922, v. 48. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 535.

Martin, A. Inequality of pupils with tuberculosis. Bull. Med., 1922, v. 36, p. 281. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 461.

Samaja, N. Pupil and respiration. Riv. di Psichiat., 1922, v. 10, pp. 207-240. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 165.

Szily, A. v. Fat in anterior chamber. Deut. ophth. Gesell. in Jena, 1922, pp. 285-288.

Wüllenweber, G. Pupil anomalies in syphilis. Deut. Zeit. f. Nervenheilk., 1922, v. 74, pp. 350-356. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 420.

Zur Nedden, M. Technic of draining anterior chamber. Deut. ophth. Gesell. in Jena, 1922, pp. 165-168.

THE UVEAL TRACT.

Bartels, M. Diagnosis of gonorrheic iritis. Klin. M. f. Augenh., 1922, v. 68, p. 387.

Brandt. Blood formation in iris. Klin. M. f. Augenh., 1922, v. 69, p. 845.

Chance, B. Etiology of uveitis. A. J. O., . 1923, v. 6, pp. 284-291.

Delorme. Tuberculous uveitis treated by tuberculin C. L. Arch. d'Opht., 1923, v. 40, pp. 93-98.

Fiessinger, N. Hemosporitic iridochoroiditis. Jour. des Practiciens, 1922, v. 36, pp. 715-716. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 171.

Fromaget, C. Pearl cyst of iris. Soc. de Méd. et de Chir. de Bordeaux, 1923, Feb. Abst. Jour. Méd. de Bordeaux, 1923, v. 95, p. 162.

Gloor, A. Congenital anomalies of iris, corectopia, polycoria and aniridia. Soc. des. Ocul. Suisses, 1922, June. Abst. Rev. Gén. d'Opht., 1922, v. 36, p. 320.

Congenital iris anomaly. Klin. M. f. Augenh., 1922, v. 68, p. 127.

Goerlitz. Ossification of choroid. Klin. M. f. Augenh., 1922, v. 68, p. 391.

Groenouw. Specimens of inversion of iris. Deut. ophth. Gesell. in Jena, 1922, p. 300.

Heine. Heterochromia of iris. Klin. Woch. 1923, v. 2, p. 345.

Herrenschwand, v. Heterochromia with cyclitis and cataract. Deut. ophth. Gesell. in Jena, 1922, pp. 223-226.

Hippel, v. Friedmann's treatment of iris tuberculosis. Deut. ophth. Gesell. in Jena, 1922, p. 282.

Hoffmann. Pearl cyst of iris. Klin. M. f. Augenh., 1922, v. 68, p. 394.

Janku, J. Tubercle of optic disc and choroid tuberculosis. Casopis Lek. Cesk., 1923, v. 62, p. 38.

Krauss. Iridochoroiditis. Klin. M. f. Augenh., 1922, v. 68, p. 388.

Licsko, A. Iris atrophy. Klin. M. f. Augenh., 1922, v. 69, p. 853.

Metzger. Heterochromia in sympathetic disease. Klin. M. f. Augenh., 1922, v. 69, p. 838.

Iris changes in diabetes. Klin. M. f. Augenh., 1922, v. 69, p. 833.

Nakagawa, T. Iris reflex movement (Kalebassen) Pflüger's Arch. f. d. ges. Physiol., 1922, v. 196, pp. 123-126. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 41.

Raveyrc, P. Iridochoroiditis and cerebrospinal meningitis. Lyon thesis, 1921. Abst. Arch. d'Opht., 1923, v. 40, p. 127.

Schieck, F. Anterior border of iris and aqueous humor. Deut. ophth. Gesell. in Jena, 1922, pp. 39-41.

Somogyi, Z., Jr. Bilateral partial congenital aniridia. Klin. M. f. Augenh., 1922, v. 69, p. 853.

Stähli, J. Precipitate formation from standpoint of colloidal chemistry and surface tension. Klin. M. f. Augenh., 1922, v. 69, p. 123.

Endogenous recurring hypopion iritis. Klin. M. f. Augenh., 1922, v. 69, pp. 721-731.

Willetts, J. E. Specific vascular descemetitis. (dis.) A. J. O., 1923, v. 6, pp. 304-307.

Wolfrum, M. Koganei's clump cells. (1 ill.) Klin. M. f. Augenh., 1922, v. 69, pp. 591-597. Abst. Internat. Sur. Ophth., 1922, v. 5, p. 126.

Repeated titles. **Roche.** (A. J. O., 1923, v. 6, p. 347) Internat. Sur. Ophth., 1923, v. 5, p. 134. **Rossi.** (A. J. O., 1923, v. 6, p. 75) A. J. O., 1923, v. 6, p. 341.

SYMPATHETIC DISEASE.

Palich-Szanto, O. Therapy of sympathetic ophthalmia. Klin. M. f. Augenh., 1922, v. 69, pp. 799-806.

Rollet and Bussy. Sympathetic ophthalmia. Lyon. Méd., 1922, v. 131, pp. 499-502. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 512.

GLAUCOMA.

Almeida, G. de. Emotional factor in glaucoma. Brazil Med., 1923, v. 1, p. 15. Abst. J. A. M. A., 1923, v. 80, p. 966.

Baenziger, T. Acute glaucoma and results of iridectomy. (7 ill.) Deut. ophth. Gesell. in Jena, 1922, pp. 43-48.

Bane, W. C. and W. M. Right retinal detachment, left glaucoma. A. J. O., 1923, v. 6, p. 299.

Bliedung, C. Experimental tonometry. Klin. M. f. Augenh., 1922, v. 68, p. 390.

Brunetti, L. Hemorrhagic glaucoma treated with x-ray. Actinoterapia, 1923, v. 3, p. 70. Abst. Internat. Sur. Ophth., 1923, v. 5, p. 180.

Cornberg. Results of repeated tests with Schiötz tonometer. Deut. ophth. Gesell. in Jena, 1922, p. 305.

Csapody, S. v. Intraocular tension and thyroid function. Klin. M. f. Augenh., 1922, v. 69, p. 855.

Cucco, A. Etiology and pathogenesis of hydrophthalmos. (12 ill. 2 pl. bibl.) Ann. di Ottal. e Clin. Ocul., 1922, v. 50, pp. 621-678.

Elschnig, A., and Böhm, F. Glaucoma operations. (bibl.) Zent. f. d. ges. Ophth. u. i. Grenz., 1922, Dec. 19, pp. 481-490.

Erdös, O. Cyclodialysis or trephining? Szemeszet, 1922, v. 56, pp. 12-14. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 395.

Grünert. Results of Elliot's trephining. Klin. M. f. Augenh., 1922, v. 68, p. 392.

Hamburger, C. Nutrition of eyes. (1 ill.) Klin. M. f. Augenh., 1922, v. 68, pp. 393-407.

Kadlicky, R. Pathogenesis of glaucoma. Zent. f. d. g. Ophth. u. i. Grenz., 1923, v. 9, p. 287.

Licsko, A. Glaucoma following use of x-ray. Szemeszet, 1922, v. 56, p. 15. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 394.

Lundsgaard, K. K. K. Light treatment of eye disease (glaucoma). Hospitalstid., 1922, v. 65, pp. 43-46. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 144.

Maggiore, L. Glaucoma after detachment of retina. (11 ill. bibl.) Ann. di Ottal. e Clin. Ocul., 1923, v. 51, pp. 1-26.

Märtens. Specimens of human glaucomatous eyes. Klin. M. f. Augenh., 1922, v. 68, p. 394.

Middleton, W. S. Decreased intraocular tension in diabetic coma. Wisconsin Med. Jour., 1923, v. 21, p. 458.

Nakamura, B., Mukai, H., and Kosaki, S. Nutrition of eye. Klin. M. f. Augenh., 1922, v. 69, p. 642. Abst. Internat. Sur. Ophth., 1923, v. 5, p. 76.

Seidel, E. Nakamura, Mukai and Kosaki's work on nutrition of eyes. Klin. M. f. Augenh., 1922, v. 69, pp. 815-835.

Variation of fluids in eye. Klin. M. f. Augenh., 1922, v. 69, p. 773. Deut. ophth. Gesell. in Jena, 1922, p. 280.

Uhthoff, W. Glaucoma. Deut. med. Woch., 1923, v. 49, p. 6. Abst. J. A. M. A., 1923, v. 80, p. 882.

Repeated titles. **Blatt.** (O. L., 1922, v. 17, p. 549) Brit. Jour. Ophth., 1923, v. 7, p. 201. **Bonnefon.** (A. J. O., 1923, v. 6, p. 157) Internat. Sur. Ophth., 1923, v. 5, p. 78.

CRYSTALLINE LENS.

Alberti, W. Regeneration of lens. Arch. f. Entwickl. d. Organismen., 1922, v. 50, p. 355. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 21.

Bane, W. C. and **W. M.** Cataract with anterior synechia. A. J. O., 1923, v. 6, p. 299.

Davis, A. E. Lens antigen to absorb cortical matter. A. J. O., 1923, v. 6, pp. 295-296.

Elschnig. Extraction of senile cataract in capsule. Deut. ophth. Gesell. in Jena, 1922, pp. 169-171.

Separation of layers of zonula in glassblowers' cataract. Klin. M. f. Augenh., 1922, v. 69, pp. 732-735, v. 70. p. 325.

Equen, M. Cataract extraction among Confederate veterans. Jour. Med. Assn. Georgia, 1923, v. 12, pp. 97-101.

Fialho, A. Spontaneous luxation of crystalline lens. Brazil Med., 1923, v. 37, p. 143.

Friede, R. Technic of cataract extraction. Zeit. f. Augenh., 1923, v. 49, p. 347.

Gala, A. Significance of fold in lens capsule. Bratislavské lekárske listy, 1922, v. 1, pp. 259-273. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 173.

Green, J., Jr. Factors of safety in cataract operation. Jour. Missouri State Med. Assn., 1923, v. 20, pp. 83-88.

Grosz, E. v. Hereditary cataract. Klin. M. f. Augenh., 1922, v. 69, p. 853.

Hektoen, L. Immune reactions of lens. (3 tables, bibl.) A. J. O., 1923, v. 6, pp. 276-278. (dis. p. 319).

Horvath, B. Cataract after grippe. Szemesset, 1922, v. 56, pp. 3-4.

Hughes, W. F. Modification of Barraquer erisiphake. Jour. Indiana State Med. Assn., 1923, v. 16, pp. 79-84.

Jess, A. Contents of lens protein histidin, arginin, and lysin. Hoppe-Seyler's Zeit. f. physiol. Chem., 1922, v. 122, pp. 160-165. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 46.

Johnson, G. L. Extraction of crystalline lens in capsule. (4 ill.) Arch. d'Opht., 1923, v. 40, pp. 99-104.

Kruedener, V. Subconjunctival cataract operation. (3 ill.) Deut. ophth. Gesell. in Jena, 1922, pp. 172-174.

Meesmann, A. Detachment of zonule with luxation of lens. (1 ill.) Deut. ophth. Gesell. in Jena, 1922, pp. 8-10.

Heyer-Steineg. Operative treatment of beginning senile cataract. Klin. M. f. Augenh., 1922, v. 69, p. 841.

Peters, A. Hereditary cataract. Zeit. f. Konstitutionsl., 1922, v. 8, p. 545. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 151.

Reidl, A. Congenital opacity of lens and pupil membrane. (2 ill.) Klin. M. f. Augenh., 1922, v. 69, pp. 482-486.

Seefelder. Rupture of wound after cataract operation. (dis.) Klin. M. f. Augenh., 1922, v. 69, p. 520.

Sichel, A. W. Glass workers' cataract occurring in other occupations. (bibl.) Brit. Jour. Ophth., 1923, v. 7, pp. 161-167.

Soria. Reclination for cataract. Arch. de Oft. Hisp.-Amer., 1923, v. 23, pp. 42-44.

Speciale-Cirincione. Congenital luxation of lens. (2 ill.) Ann. di Ottal. e Clin. Ocul., 1923, v. 51, pp. 68-71.

Stanka, R. Accommodative change of position of opacity of lens. Klin. M. f. Augenh., 1922, v. 69, p. 731.

Szekacs, I. Results of discission. Szemeszet, 1922, v. 56, p. 14. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 393.

Thilliez. Expulsive hemorrhage after cataract operation. Soc. Franç. d'Opht., 1922, May. Abst. Rev. Gén. d'Opht., 1922, v. 36, p. 340.

Vasconcellos, M. de. Fulguration cataract. Brazil Med., 1923, v. 37, p. 135.

Woerdemann, M. W. Extirpation of lens of frog larva. Arch. f. Entwickl. d. Organ., 1922, v. 51, pp. 625-627. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 22.

Young, G. Macular perception in advanced cataract. (4 ill.) Brit. Jour. Ophth., 1923, v. 7, pp. 167-170.

Zentmayer, W. Complete discission for traumatic cataract. (dis.) A. J. O., 1923, v. 6, p. 309.

Repeated title. **Beauvieux** and **Germain.** (A. J. O., 1922, v. 5, p. 598) Brit. Jour. Ophth., 1923, v. 7, p. 185.

THE VITREOUS HUMOR.

Basterra Santa Cruz, J. Extraction of vitreous humor in ophthalmic therapy. Med. Ibera, 1922, v. 16, pp. 81-84; 101-105; 120-123; 137-139. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 143.

Cholina, A. A. Persistent hyaloid artery. Klin. Vereinig. de Ophth., 1922, v. 2 X. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 151.

Comberg. Anterior surface of vitreous examined with slit lamp. Deut. ophth. Gesell. in Jena, 1922, pp. 259-263.

Contino, A. Asteroid bodies in vitreous. (3 pl. bibl.) Ann. di Ottal. e Clin. Ocul., 1923, v. 51, pp. 63-67.

Gebb, H. Recovery after changes in vitreous from albuminuria. Deut. ophth. Gesell. in Jena, 1922, pp. 21-25.

Jess, A. Normal and pathologic changes in vitreous. (8 ill. bibl.) Deut. ophth. Gesell. in Jena, 1922, pp. 11-21.

Shields, J. M. Persistent canal of Cloquet. (dis.) A. J. O., 1923, v. 6, p. 299.

Van Creveld. Surface tension of vitreous. Klin. M. f. Augenh., 1922, v. 69, p. 519.

THE RETINA.

Abelsdorff, G., Dieter, W., and **Kohlrausch, A.** Dark adaptation with various color systems and with disturbance of adaptation. Pflüger's Arch. f. d. ges. Physiol., 1922, v. 196, pp. 118-122. Abst. Zent. f.

d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 137.

Adams, E. Q., and Cobb, P. W. Effect on foveal vision of bright and dark surroundings. Jour. Exper. Psychol., 1922, v. 5, pp. 39-45.

Bachstez. Aneurysm of internal carotid and arteriosclerosis of retinal vessels in kidney disease. Klin. M. f. Augenh., 1922, v. 69, p. 851.

Balbuena, F. F. Cajal's method of retinal puncture. Zeit. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 478.

Beauvieux and Pesme. Diabetic retinitis. (1 col. pl. 2 ill.) Arch. d'Opht., 1923, v. 40, pp. 65-88.

Bell, J. Retinitis pigmentosa and allied diseases. Congenital stationary night blindness and glioma retinae. Cambridge University Press, London, 1922.

Benedict, W. L., and Mussey, R. D. Detachment of retina in pregnancy. A. J. O., 1923, v. 6, pp. 268-270.

Clausen. Retinitis circinata and exudative retinitis. Klin. M. f. Augenh., 1922, v. 69, p. 844.

Fleischer. Pathogenesis of chorioretinitis juxtapapillaris. (dis.) Deut. ophth. Gesell. in Jena, 1922, pp. 140-147.

Gebb. Disturbances of adaptation in lues of central nervous system. Klin. M. f. Augenh., 1922, v. 69, p. 838.

Grafe. Retinal changes in diabetes. Klin. M. f. Augenh., 1922, v. 69, p. 841.

Gray, H., and Roat, H. F. Lipemia retinalis. J. A. M. A., 1923, v. 80, pp. 995-999.

Hippel, E. v. Retinal hemorrhage. Klin. M. f. Augenh., 1922, v. 68, p. 394.

Jacobovics, B. Amaurotic family idiocy. Orvosi Hetilap., 1922, v. 66, pp. 273-274. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 429.

Kraupa, E. Pathogenesis and therapy of ischemia of retina. (dis.) Deut. ophth. Gesell. in Jena, 1922, pp. 212-216.

Merz Weigandt, C. Neuroretinitis with cryptogenic staphylococcic infection. Klin. M. f. Augenh., 1922, v. 69, pp. 666-669. Abst. Internat. Sur. Ophth., 1923, v. 5, p. 142.

Piéron, H. Chromatic diffusion and luminous excitation of retina. Compt. rend. des. Sc. de la Soc. Biol., 1922, v. 86, p. 922. Abst. Zent. f. d. ges. Ophth. u. i. Grenz, 1922, v. 8, p. 492.

Portier. Double foveae. Soc. de Biol., 1923, Feb. 10. Abst. Gaz. des Hôp., 1923, v. 96, p. 326.

Pottle, F. W. Central retinitis due to localized infections. (3 ill. bibl.) Arch. of Optometry, 1923, v. 2, pp. 92-98.

Sava-Goin, G. Night blindness in Roumanian army, 1915-18. Rev. Sanit. Milit., 1922, v. 20, pp. 3-11. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 292.

Schieck. Uvea in albuminuric retinitis. Klin. M. f. Augenh., 1922, v. 69, p. 846.

Schlippe. Choked disc with albuminuric retinitis. Klin. M. f. Augenh., 1922, v. 69, p. 840.

Schrieber. Origin of retinal detachment in myopic eye. Deut. ophth. Gesell. in Jena, 1922, p. 300.

Schrottenback, H. Visual illusions. Zeit. f. d. ges. Neurol. u. Psychiat., 1922, v. 78, p. 87. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 493.

Stargardt, K. Treatment of detachment of retina. Deut. ophth. Gesell. in Jena, 1922, pp. 248-251.

Stieren, E. Retinitis pigmentosa. (2 ill.) Atlantic Med. Jour., 1923, v. 26, p. 467.

Thomas, T. Embolism of central artery of retina. Lancet, 1923, April 7, p. 701.

Uhthoff, W. Visual disturbances and changes in eyegrounds in anemia. (2 ill.) Deut. ophth. Gesell. in Jena, 1922, pp. 204-212.

Van der Hoeve, J. Swelling of retina and papilla. Deut. ophth. Gesell. in Jena, 1922, pp. 32-36.

Vincentiis, G. de. Blind spot in normal and pathologic eyes. (36 ill. bibl.) Ann. di Ottal. e Clin. Ocul., 1922, v. 50, pp. 495-607.

Warren, H. C. Visual after effects. Psychol. Rev., 1921, v. 28, pp. 453-463.

Wissman, R. Changes of eyeground in pregnancy. (4 ill.) Deut. ophth. Gesell. in Jena, 1922, pp. 263-271.

Wood, H. Central retinitis. A. J. O., 1923, v. 6, p. 316.

Repeated title. **Salzmann.** (A. J. O., 1922, v. 5, p. 165) A. J. O., 1923, v. 6, p. 341.

TOXIC AMBLYOPIAS.

Berlandi. Alcoholic amblyopia. Lyon thesis, 1921. Abst. Arch. d'Opht., 1923, v. 40, p. 126.

Evans, J. N. Quinin amblyopia. (6 ill.) A. J. O., 1923, v. 6, pp. 271-275.

Goldschmidt, M. Methyl alcohol poisoning. Experimental. Deut. ophth. Gesell. in Jena, 1922, pp. 129-139.

Marin Amat, M. Amaurosis from quinin. Arch. de Oft. Hisp.-Amer., 1923, v. 23, pp. 166-169.

Sattler, C. H. Tobacco and alcohol poisoning. Klin. M. f. Augenh., 1922, v. 69, p. 526.

Zentmayer, W. Toxic amblyopia with retinal hemorrhage. (dis.) A. J. O., 1923, v. 6, p. 313.

THE OPTIC NERVE.

Arlt, E. Treatment of tabetic optic nerve atrophy. Zeit. f. ärztl. Fortbild., 1922, v. 19, pp. 367-370. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 426.

Babinski. Papilledema and relief of intracranial pressure. Concours. Méd., 1922, Aug. 6. Abst. Clin. Opht., 1922, v. 26, pp. 491-496.

Baliña, P. L. Arsenomercurial treatment of tabetic optic atrophy. Bull. de la Soc. Franç. de Dermatol. et Syphil., 1922, pp. 69-77. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 297.

Bartelmez, G. W. Origin of otic and optic primordia in man. Jour. Comp. Neurol., 1922, v. 34, pp. 201-232. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 269.

Bartels. Tubercular papillitis. Klin. M. f. Augenh., 1922, v. 68, p. 387.

Buchanan, L. Monocular optic neuritis. (bibl.) Brit. Jour. Ophth., 1923, v. 7, pp. 170-174.

Byrnes, C. M. Congestions and inflammations of optic discs from standpoint of neurologist. (dis.) A. J. O., 1923, v. 6, p. 303.

Cords, R. Rhinogenous retrobulbar neuritis. Klin. M. f. Augenh., 1922, v. 68, p. 129.

Dandy, W. E. Congestions and inflammations of optic discs from standpoint of surgeon. (dis.) A. J. O., 1923, v. 6, p. 303.

Friedenwald, H. Congestions and inflammations of optic discs from standpoint of ophthalmologists. (dis.) A. J. O., 1923, v. 6, p. 301.

Igersheimer, J. Spirochetes in visual tracts in tabes and dementia. Deut. ophth. Gesell. in Jena., 1922, p. 289.

Janku, J. Tubercle of optic disc and choroid. Casopis Lek. Ceskych., 1923, v. 62, p. 1.

Keilmann, K. Retrobulbar neuritis with hypophyseal cyst. Zent. f. allg. Path. u. path. Anat., 1922, v. 33, pp. 113-115. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 176.

Krausse. Optic neuritis from lactation. Klin. M. f. Augenh., 1922, v. 69, p. 840.

Optic nerve exphothalmic goiter. New York Med. Jour., 1923, April, p. 430.

Pakozdy, K. Acute neuritic amaurosis after ethmoiditis. Orvosi Hetilap., 1922, v. 66, p. 301. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 427.

Pincoff, M. C. Congestions and inflammation of optic discs from standpoint of internist. (dis.) A. J. O., 1923, v. 6, p. 303.

Römer. Retrobulbar neuritis. Klin. M. f. Augenh., 1922, v. 68, p. 385.

Scheerer, R. Pigment cells in optic nerve. (1 ill.) Klin. M. f. Augenh., 1922, v. 69, pp. 583-591. Abst. Internat. Sur. Ophth., 1923, v. 5, p. 144.

Stilwill, H. R. Optic atrophy from pituitary disease. (dis.) A. J. O., 1923, v. 6, p. 300.

Terrien. Bilateral optic atrophy and antityphoid vaccination. Arch. d'Opht., 1923, v. 40, pp. 89-92.

Repeated titles. **Iconomopoulos.** (A. J. O., 1923, v. 6, p. 158) Internat. Sur. Ophth., 1923, v. 5, p. 141. **Sattler.** (A. J. O., 1922, v. 5, p. 166) A. J. O., 1923, v. 6, p. 341.

VISUAL TRACTS AND CENTERS.

Gonzalez, L. Quadrant hemianopsia. Anales de la Soc. Mex. de Oft. y Oto-Rino-Laryn., 1922, v. 3, pp. 175-214.

Hill, E. Bitemporal contraction of visual field. (4 ill. bibl.) A. J. O., 1923, v. 6, pp. 257-268.

Horvath, B. v. Homonymous hemianopsia after loss of blood. Klin. M. f. Augenh., 1922, v. 69, p. 855.

Oloff. Visual fields in psychogenic diseases. Deut. ophth. Gesell. in Jena, 1922, pp. 256-259.

Pichler, A. Field of vision in new and old injuries. Zeit. f. Nervenh., 1922, v. 74, pp. 357-365. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 9, p. 40.

Schwarz. Memory vision. Klin. M. f. Augenh., 1922, v. 69, p. 518.

COLOR VISION.

Berry, W. Colors in after image of bright light. Psychol. Bull., 1922, v. 19, pp. 307-337.

Engelking, E. Pupil reaction in congenital total color blindness. Deut. ophth. Gesell. in Jena, 1922, pp. 200-202.

Hess, C. v. Color theory. Ergebn. d. Physiol., 1922, v. 20, pp. 1-107. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 138.

Intermediate step between partial and total color blindness. Arch. neérland de Physiol. de l'Homme et des Anim. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 139.

Holm, E.. Decoloration of visual purple. Compt. rend. des. Sc. de la Soc. de Biol., 1922, v. 87, p. 465. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 493.

Fading of visual purples. Bibliotek f. Laeger., 1922, v. 114, pp. 205-211. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 132.

Ko, C. Extracentral color sensitivity of retina. Jahresvers. de japan. ophth. Ges., 1922, v. 4, No. 2 and 3. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 139.

Maggiore, L. C. v. Hess' color doctrine. Ann. di Ottal. e Clin. Ocul., 1922, v. 50, pp. 679-689.

Modern theories of color vision. J. A. M. A., 1923, v. 80, p. 1088.

Ostwald, W. Color theory of Newton. Deut. med. Woch., 1922, v. 48, pp. 1237-1238. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., v. 8, p. 27.

Report of railroad physicians on methods of determining color sense. Zeit. f. Bahn-u. Bahnkass., 1922, v. 17, pp. 141-145. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 140.

Rochat, G. F. Binocular fusion of complementary colors. Arch. neérl. de Physiol. de l'Homme et des Anim., 1922, v. 7, p. 263. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 184.

Schanz, F. Origin of complementary colors. Deut. ophth. Gesell. in Jena, 1922, pp. 277-279.

Seitz, W. Helmholtz-Exner color saturation and Ostwald's color system. Physikal Zeit., 1922, v. 23, pp. 146, 158, 297, 301. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 26.

Tscherning, M. Theory of Young on color vision. Arch neérl. de Physiol. de l'Homme et des Anim., 1922, v. 7, pp. 450-453. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 182.

THE EYEBALL.

Becker. Congenital exophthalmos and chondrocavernoma of orbit in left and congenital microphthalmos in right eye. (1 ill.) Deut. ophth. Gesell. in Jena, 1922, pp. 271-272.

Boon, U. C. Congenital anophthalmos. Jour. Oklahoma State Med. Assn., 1923, v. 16, p. 63.

Heine. Ectodermal formations in eyeball. (9 ill.) Deut. ophth. Gesell. in Jena, 1922, pp. 25-32.

Koyanagi, Y. Condition of retina in microphthalmos with orbital cyst. Genesis of ocular anomalies. (3 ill.) Klin. M. f. Augenh., 1922, v. 69, pp. 445-449.

McCaw, J. A. Microphthalmus. (dis.) A. J. O., 1923, v. 6, p. 301.

Magnus, G., and Stuebel, A. Lymphatic vessels of eyes. Deut. ophth. Gesell. in Jena, 1922, pp. 36-38.

Palich-Szanto, O. Pathologicanatomic and pathohistologic examination of eyes in anencephaly. Klin. M. f. Augenh., 1922, v. 69, pp. 503-514.

Silfast, J. Congenital anomalies. Klin. M. f. Augenh., 1922, v. 69, pp. 815-834.

Stein. Technic of enucleation. Klin. M. f. Augenh., 1922, v. 69, p. 841.

Thies. Metastasis from staphylococcic sepsis. (2 ill.) Klin. M. f. Augenh., 1922, v. 69, pp. 786-788.

Repeated title. **Coulomb.** (A. J. O., 1923, v. 6, p. 349) Internat. Sur. Ophth., 1923, v. 5, p. 90.

THE LACRIMAL APPARATUS.

Ashikaga, R. Anatomy of lacrimal passages of Japanese. Jahresvers. d. japan. ophth. Gesell., 1922, v. 4, No. 2 and 3. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9,, p. 146.

Berger, F. v. Cauterization of lacrimal sac in cure of dacryocystitis. Boll. d'Ocul., 1922, v. 1, pp. 400-410. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 148.

Blegvad, N. R. Intranasal operation of lacrimal sac. West. Hospitalstid., 1922, v. 65, pp. 49-57. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 149.

Gabriélidès, C. Total extirpation of lacrimal canal. Lyon thesis, 1921. Abst. Arch. d'Opht., 1923, v. 40, p. 124.

Hensen and Lorey. Treatment of epiphora by radiation of lacrimal gland. Münch. med. Woch., 1922, v. 69, p. 1573. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 148.

Kusunoki, A. Alkalescence of lacrimal fluid. Jahresvers. d. japan. ophth. Ges., 1922, v. 4, Nos. 2 and 3. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 146.

Kutvirt, O. Dacryorhinostomy by oral passages. Rev. de Laryng. d'Otol. et de Rhinol., 1922, v. 43, pp. 675-679. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 149.

Rubbrecht, R. Dacryocystorhinostomy. Vlaamsch. Geneesk. Tijds., 1922, v. 3, pp. 412-417. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 503.

Strobell, H. New instrument for Toti's operation. Klin. M. f. Augenh., 1922, v. 69, pp. 464-466.

Weihmann. Transplantation of blood vessels in extirpation of tear sac. Klin. M. f. Augenh., 1922, v. 69, p. 847.

Wirtz. Leptothricosis of lacrimal canal. Klin. M. f. Augenh., 1922, v. 68, p. 385.

DISEASES OF THE LIDS.

Albin, M. Familial congenital distichiasis. Polska Gaz. Lek., 1923, v. 2, p. 9. Abst. Internat. Sur. Ophth., 1923, v. 5, p. 169.

Albrich, K. Blaskovics' operation of epicanthus and canthoplasty. Klin. M. f. Augenh., 1922, v. 69, p. 854.

Burke. Persistent edema of lower eyelids. Pittsburgh Dermat. Soc., 1923, Jan. Abst. Arch. of Dermat. and Syphil., 1923, v. 7, p. 561.

Cason, H. Conditioned eyelid reaction. Jour. Exper. Psychol., 1922, v. 5, pp. 153-196.

Cords, E. "Lid cartilage." Zeit. f. Anat. u. Entwickl., 1922, v. 65, pp. 277-283. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 132.

Doussain. A typical oculopalpebral tuberculosis. Jour. de Méd. de Paris, 1922, v. 41, p. 253. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 443.

Filatow, W. P. Treatment of meibomian blepharitis. Klin. M. f. Augenh., 1922, v. 69, pp. 657-660. Abst. Internat. Sur. Ophth., 1923, v. 5, p. 113.

Heckel, E. B. Gumma of eyelid. A. J. O., 1923, v. 6, p. 308.

Hinze, R. Plastic operation for ptosis. Polska Gaz. Lek., 1922, v. 1, p. 916. Abst. Internat. Sur. Ophth., 1923, v. 5, p. 169.

Jackson, E. Lid plate. A. J. O., 1923, v. 6, p. 332.

Kogan, N. D. Blepharitis. Klin. Vereinig. der Ophth., 1922, v. 23 X. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 166.

Moretti, E. Operation for entropion. Boll. d'Ocul., 1922, p. 215. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 377.

Onken. Galvanocautery for beginning senile ectropion. Klin. M. f. Augenh., 1922, v. 68, p. 393.

Piccaluga, F. Modification of Panas' operation for ptosis. Boll. d'Ocul., 1922, pp. 335-339. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 463.

Pick, L. Operation for trichiasis and ptosis. (3 ill.) Klin. M. f. Augenh., 1922, v. 69, pp. 754-757.

Schall, E. Gonorrheic lid abscess. Klin. M. f. Augenh., 1922, v. 69, p. 579. Abst. Internat. Sur. Ophth., 1923, v. 5, p. 115.

Scharrenberg, R. Gumma of eyelid. Köln diss., 1921. Bonn. A. Marcus and E. Weber, 1922. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 167.

Szily, A. v. Congenital districhiasis. Deut. ophth. Gesell. in Jena, 1922, p. 288.

Theil. Associated movements of upper lid with congenital partial oculomotor paralysis. (4 ill.) Deut. ophth. Gesell. in Jena, 1922, pp. 297-300.

Wick, W. Plastic operations on conjunctival sac. Klin. M. f. Augenh., 1922, v. 68, p. 127.

Wirtz. Lid ulcer with ring worm. Klin. M. f. Augenh., 1922, v. 68, p. 385.

DISEASES OF THE ORBIT.

Broca. Bilateral ligation of common carotids in pulsating exophthalmus. Soc. de Chir., 1923, Feb. 21. Abst. Gaz. d. Hôp., 1923, v. 96, p. 308.

Cauchoix. Anatomoclinical forms and treatment of pulsating exophthalmos. Soc. Opht. de Paris, Nov. 1922. Abst. Arch. d'Opht., 1923, v. 40, pp. 113-114.

Fazakas, S. Cavernous sinus thrombosis and orbital phlegmon. Szemeszet., 1922, v. 56, pp. 5-6. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 199.

Marzio, di. Cavernous angioma of orbit. (20 ill. 2 pl. bibl.) Ann. di Ottal. e Clin. Ocul., 1923, v. 51, pp. 26-58.

Meanor, W. C. Orbital cellulitis in scarlet fever. Atlantic Med. Jour., 1923, v. 26, p. 464.

Morelli, E. Menstrual exophthalmos. Boll. d'Ocul., 1922, pp. 388-399. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 201.

Ritter, M. P. Aneurysm of internal carotid. Klin. M. f. Augenh., 1922, v. 69, p. 839.

Safranek, J. Mesoorbital encephalocele treated by operation. Zeit. f. Hals. Nasen.-u. Ohrenhlk., 1922, v. 3, p. 560. Abst. Internat. Sur. Ophth., v. 5, p. 190.

Weisser, E. A. Unilateral proptosis; abscess of frontal lobe of brain. A. J. O., 1923, v. 6, p. 307.

INJURIES.

Bane, W. C. and W. M. Steel in vitreous. (dis.) A. J. O., 1923, v. 6, p. 298.

Barczinski, S. Injury to eye from bee sting. Klin. M. f. Augenh., 1922, v. 69, pp. 769-772.

Carpenter, C. Gun shot wound with fragment of finger in globe. A. J. O., 1923, v. 6, p. 309.

Clausen. Copper changes in eyes. Klin. M. f. Augenh., 1922, v. 69, p. 847.

Delord, E. Ocular lesions from juice of elatorium. Clin. Opht., 1923, v. 27, p. 72.

Denti, A. V. Vegetable splinter in iris. Boll. d'Ocul., 1922, v. 1, pp. 284-290. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 451.

Engelbrecht, W. Bilateral cataract from electric current. (bibl.) Zeit. f. Augenh., 1923, v. 49, pp. 345-346.

Gibson, J. L. Siderosis. Brit. Jour. Ophth., 1923, v. 7, pp. 174-177.

Green, O. I. Treatment of eye injuries with conjunctival flap in perforations. Jour. Oklahoma State Med. Assn., 1923, v. 16, pp. 61-63.

Jung. Diagnosis of foreign body with roentgen ray. Klin. M. f. Augenh., 1922, v. 68, p. 385.

Kampanejetz. Compensatory eye movements in air contusion. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 212.

Markel, J. C. Penetrating injury of eyeball. A. J. O., 1923, v. 6, p. 307.

Nobles, M. A. Fracture of orbit. Med. World, April, 1923, p. 138.

Piroschkow, L. N. Wounds of eye in brain injury. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 323.

Schüller. Small shot wounds of eye and brain. Klin. M. f. Augenh., 1922, v. 69, p. 840.

Verweij, A. Localization of foreign bodies in eye. Nederl. Tijdschr. v. Geneesk., 1922, v. 66, pp. 439-442. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 417.

Repeated title. **Depas.** (O. L., 1921, v. 17, p. 271) Brit. Jour. Ophth., 1923, v. 7, p. 195.

TUMORS.

Adrogue, E. Choroidal metastasis with endothelioma of pleura. (1 col. pl.) La Prensa Med. Argentina, 1923, v. 9, pp. 862-865.

Behr, C. Metastatic carcinoma of choroid and optic nerve. (1 ill.) Klin. M. f. Augenh., 1922, v. 69, pp. 788-799.

Boeheimer, J. Melanoleucosarcoma of choroid. Frankfurt Inaug. Diss., 1919. Abst. Klin. M. f. Augenh., 1922, v. 69, p. 547.

Bucur, P. N. Fibroma of sclera. Rev. Sanit. Milit., 1922, v. 20, p. 18. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 287.

Cords, R. Carcinomatous invasion of optic nerve. Deut. ophth. Gesell. in Jena, 1922, p. 293.

Cucco, A. Osteoma of orbit operated after Cirincione. Ann. di Ottal. e Clin. Ocul., 1923, v. 51, pp. 57-62.

Dollet, H. Paths of outlet at ocular posterior pole of choroidal melanoma. Lyon thesis, 1921. Abst. Arch. d'Opht., 1923, v. 40, p. 125.

Ginestous and Nancel-Penard. Myeloma in region of lacrimal sac. Jour. Méd. de Bordeaux, 1923, v. 95, pp. 164 and 168.

Hippel, E. v. Enucleation in sarcoma of choroid. (dis.) Deut. ophth. Gesell. in Jena, 1922, pp. 147-155.

Sarcoma of choroid. Klin. M. f. Augenh., 1922, v. 68, p. 395.

Hoffman. Dermoid of orbit. Klin. M. f. Augenh., 1922, v. 68, p. 394.

Kranz. Carcinoma of orbit. Klin. M. f. Augenh., 1922, v. 69, p. 837.

Kumer. Radium treatment of lid tumors. Klin. M. f. Augenh., 1922, v. 69, p. 851.

Lindenmeyer. Osteoma of frontal sinus. Klin. M. f. Augenh., 1922, v. 69, p. 837.

Löhlein. Melanosis of conjunctiva. Klin. M. f. Augenh., 1922, v. 68, p. 389.

Metzger, E. L. Neuroblastoma of retina. Klin. M. f. Augenh., 1922, v. 69, p. 547.

Michael, D. Melanoma of retina. Clujul. Med., 1921, v. 2, pp. 314-320. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 425.

Montgomery, D. W., and Culver, G. D. Epithelioma of lids. Urologic and Cutaneous Rev., 1923, v. 27, pp. 205-207.

Nishioka, D. Experimental traumatic iris cyst. Jahresvers. d. japan. ophth. Ges., 1922, v. 4, Nos. 2 and 3. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 172.

Peter, L. C. Myxosarcoma involving orbit, electrocoagulation. A. J. O., 1923, v. 6, p. 309.

Popovici, M. Epithelioma of limbus (Parinaud) Clujul. Med., 1921, v. 2, p. 331. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 541.

Redaelli, F. Round cell leucosarcoma of choroid. Osp. Magg., 1922, v. 10, p. 295. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 172.

Schweikhart. Ring sarcoma of ciliary body. Inaug. Diss. Frankfurt, 1918. Abst. Klin. M. f. Augenh., 1922, v. 69, p. 547.

Sedan, J. Epithelioma of limbus. Marseille Méd., 1922, v. 59, p. 731. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 467.

Shannon, C. E. G. Sarcoma of lid. A. J. O., 1923, v. 6, p. 308.

Twelmeyer, O. Epithelial orbital tumor. (2 ill.) Klin. M. f. Augenh., 1922, v. 69, pp. 743-750.

Wagenmann. Multiple neuroma of eyes and tongue. (4 ill.) Deut. ophth. Gesell. in Jena, 1922, pp. 283-285.

Wood, H. Melanosarcoma. (dis. 3 ill.) A. J. O., 1923, v. 6, pp. 317-319.

Repeated titles. **Carboni.** (A. J. O., 1923, v. 6, p. 351) Internat. Sur. Ophth., 1923, v. 5, p. 121. **Maucione.** (A. J. O., 1923, v. 6, p. 351) Internat. Sur. Ophth., 1923, v. 5, p. 114. **Sgrosso.** (A. J. O., 1923, v. 6, p. 351) Internat. Sur. Ophth., 1923, v. 5, p. 111. **Van Duyse.** (A. J. O., 1923, v. 6, p. 351) Internat. Sur. Ophth., 1923, v. 5, p. 145.

PARASITES.

Bardelli, L. Intraocular cysticercus, treatment. Boll. d'Ocul., 1922, pp. 19-47. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, pp. 364-366.

Ticho, A. Ophthalmomyiasis. (bibl.) Brit. Jour. Ophth., 1923, v. 7, pp. 177-182.

COMPARATIVE OPHTHALMOLOGY.

Bruni, A. C. Tapetum of the mammalian eye. (9 ill.) Ann. di Ottal. e Clin. Ocul., 1922, v. 50, pp. 469-495.

Gilson, A. S., Jr. Effects of adrenalin on migration of scale pigment and retinal pigment in fish. Proc. Nat. Acad. of Sc., 1922, v. 8, pp. 130-133. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 24.

Hess, C. v. Vision of insects and crabs. Deut. med. Woch., 1922, v. 48, pp. 1238-1239. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 25.

Joest, E. Ocular anomalies in domestic animals. Berl. Tierärztl. Woch., 1922, v. 38, pp. 381-384. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 532.

Lindahl, C., and Joki, A. Relation of optic fissure and nerve entrance to pecten of birds. Zeit. f. Anat. u. Entwickl., 1922, v. 63, pp. 227-342. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 23.

McFadden, F. Other eyes from ours. (12 ill. bibl.) Arch. of Optometry, 1923, v. 2, pp. 75-91.

Wyman, L. C. Effect of ether on migration of scale pigment and retinal pigment in fish. Proc. Nat. Acad. Sc., 1922, v. 8, pp. 128-130. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 25.

GENERAL PATHOLOGY.

Czellitzer, A. Heredity and ophthalmology. (2 ill.) Zeit. f. Augenh., 1923, v. 49, pp. 335-345.

Fuchs. Eosinophils in eye. Arch. f. Ophth., 1918, v. 95, p. 162.

Hausen. Occurrence of fat in eye. Klin. M. f. Augenh., 1922, v. 68, p. 391.

Kneusel, O. Visibility of epithelial cells, conjunctiva, lymphatics, of nerves and their termination by vital coloration of human eye. Soc. des Ocul. Suisses, 1922, June. Abst. Rev. Gén. d'Opht., 1922, v. 36, p. 317.

Kurosawa, J. Intraocular bone formation. Jahresvers. d. japan. ophth. Ges., 1922, v. 4, Nos. 2 and 3. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 172.

Vonwyler, P. Visibility of epithelial cells and conjunctiva, lymphatics of nerves by vital coloration of human eye. Anatomic part. Soc. des Ocul. Suisses, 1922, June. Abst. Rev. Gén. d'Opht., 1922, v. 36, p. 319.

GENERAL AND EXTRAOCULAR DISEASES.

Abramowicz, I. Eye complications in acute infectious diseases and latent syphilis. Polska Gaz. Lek., 1923, v. 2, p. 8. Abst. Internat. Sur. Ophth., 1923, v. 5, p. 160.

Archangelski, P. F. Eyes in petechial fever. Rostow diss., 1921. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 317.

Avis, B. Y. Fields of oculist and practitioner. Illinois Med. Jour., 1923, v. 43, pp. 319-323.

Beckner, W. F. Focal infections in relation to eye. West Virginia Med. Jour., 1923, April, pp. 429-433.

Dunn, P. Toxemic aspect of ocular disease. Lancet, 1923, April 7, p. 696.

Endelman, L. Eye symptoms of epidemic meningitis. Neur. Polska, 1922, v. 6, pp. 187-193. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 38.

Frugieule, C. Rickets and eye disease. Boll. d'Ocul., 1922, v. 1, pp. 217-221. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 424.

Gaisbock, F. Eye in polycythemia. Ergebn. d. inn. Med. u. Kinderheilk., 1922, v. 21, p. 204. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 314.

Gasteff, A. A. Ocular complications in recurring fever epidemic in St. Petersburg in 1920. Wratschebnaja Gaseta, 1922, v. 26, pp. 42-45. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 317.

Hess. Blindness in small pox. Deut. med. Woch., 1923, v. 49, p. 21. Abst. J. A. M. A., 1923, v. 80, p. 883.

Hellin, D., and Szwarc, A. Affections of eye and ear. Bibl. Univer. Lib. Polonal, 1922, pp. 1-25. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 510.

Igersheimer, J. Ocular tuberculosis. Deut. ophth. Gesell. in Jena, 1922, pp. 57-66.

Jendralski. Roentgen treatment of tuberculosis of anterior segment. Deut. ophth. Gesell. in Jena, 1922, pp. 71-74.

Kapuscinski, W. Ocular complications in recurring fever. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 316.

Krauss. Bilateral hysteric blindness. Klin. M. f. Augenh., 1922, v. 68, p. 389.

Krückmann. Microscopic preparations of syphilitic eye diseases. Klin. M. f. Augenh., 1922, v. 69, p. 850.

Kulenkampff, D. Alcohol injections for trigeminal neuralgia. Deut. ophth. Gesell. in Jena, 1922, pp. 175-178.

Lavier, G., and Frombeure, G. Ocular complications of piroplasmosis in dog. Bull. de la Soc. Path. Exot., 1922, v. 15, pp. 545-548. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 504.

Lenz. Anatomic research on encephalitis. Deut. ophth. Gesell. in Jena, 1922, p. 192.

Löwenstein, A. Tuberculosis of eyes and its specific therapy. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, March, pp. 241-248.

Meisner, W. Treatment of ocular tuberculosis after Friedmann. Deut. ophth. Gesell. in Jena, 1922, pp. 66-68.

Monrad-Krohn, G. H. Objective test of visual fields for neurasthenia. Norsk. Mag. for Lagevid., 1923, v. 84, p. 1038. Abst. J. A. M. A., 1923, v. 80, p. 1038.

Neuling, E. Tuberculin eye test in diagnosis. Beil. Tierärztl. Woch., 1922, v. 38, p. 303. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 445.

Posey, W. C. Ocular phases of Little's disease. (dis.) A. J. O., 1923, v. 6, pp. 311-313.

Satanowsky, P. Ocular complications of erythema nodosum. Semana Med., v. 1, Jan. 4, p. 33. Abst. J. A. M. A., 1923, v. 80, p. 967.

Schlegel, M. Ocular tuberculosis in domestic animals. Arch. f. Wiss. u. prakt. Tierheilk., 1922, v. 48, pp. 1-17. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 444.

Streiff, J. Ocular conditions in facial asymmetry. Klin. M. f. Augenh., 1922, v. 69, pp. 496-503.

Stibbe, F. S. Eye disturbance in hysteria. Nederl. Tijdschr. v. Geneesk., 1922, v. 2, p. 2921. Abst. J. A. M. A., 1922, v. 80, p 1112.

Terrien, F. Late ocular accidents in spinal anesthesia. Acad. de Méd., 1922, Dec. Abst. Arch. d'Opht., 1923, v. 40, pp. 122-124.

Uribe-Troncoso, M. Psychic element in ophthalmology. A. J. O., 1923, v. 6, pp. 330-332.

Vergara, E. Oculocardiac reflex in mental disease. Cervello, 1922, v. 1, pp. 78-96. Abst. Zent. f. d. ges. Ophth. u. i. Grenz., 1922, v. 8, p. 329.

Wiegmann. Ocular complications in Recklinghausen's disease. Klin. M. f. Augenh., 1922, v. 68, p. 395.

Zeeman, W. P. C. Cardiovascular diseases and eyes. Nederl. Tijdschr. v. Geneesk, 1922, v. 2, p. 2741.

Repeated title. **Terrien.** (A. J. O., 1923, v. 6, p. 352) Internat. Sur. Ophth., 1923, v. 5, p. 82.

VISUAL HYGIENE AND PROPHYLAXIS.

Adam. Ocular disturbances from film pictures. Deut. ophth. Gesell. in Jena, 1922, p. 226.

Carhart, W. M. Better eyes make better school children. Monthly Bull. Dept. Health, New York City, 1923, v. 13, pp. 61-65.

Korff-Petersen. Hygienic illumination. J. A. M. A., 1923, v. 80, p. 939.

OPHTHALMIC SOCIOLOGY.

Buchanan, L. Glasgow eye infirmary. Story of its beginning. Glasgow Med. Jour., 1923, v. 17, pp. 169-179.

Jones, R. Blind masseurs. Brit. Med. Jour., 1923, March 17, p. 488.

Ophthalmia neonatorum in metropolitan area. Brit. Jour. Ophth., 1923, v. 7, p. 182.

Ryer, E. L. Optometry in industrial field. Arch. of Optometry, 1923, v. 2, pp. 103-105.

Standards for out patient service in ophthalmology. A. J. O., 1923, v. 6, pp. 320-328.

State recognition of opticians. Brit. Jour. Ophth., 1923, v. 7, p. 183.

EDUCATION, HISTORY AND INSTITUTIONS.

Albertotti, G. Invention of spectacles. (1 ill.) Ann. di Ottal. e Clin. Ocul., 1922, v. 50, pp. 690-696.

American Board for ophthalmic examinations. A. J. O., 1923, v. 6, pp. 328-329.

Hirschberg, J. Morgagni as an oculist. Ann. di Ottal. e Clin. Ocul., 1922, v. 50, p. 715.

Kraupa. Dexterity of Joseph Beers. Deut. ophth. Gesell. in Jena., 1922, p. 295.

Ophthalmology in Egypt and its possibilities in India. Indian Med. Gaz., 1923, v. 58, p. 121.

Pflügk, A. v. Spectacle makers of Nürnberg. (2 ill.) Deut. ophth. Gesell. in Jena, 1922, pp. 110-117.